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Notes on the Sources of the Abi Ma, or Amoo or Oxus, extracted from the Journal of Mr. E. Gardiner.—*By* M. P. Edgworth, *Esq. C. S.*

It has nineteen principal branches above Oomshurk, which will be enumerated from the S. to E. and so to N. Oomshurk is an independent fort on S. bank of the river, one day W. of Kulef, a fort on N. bank, four days W. of Thermaz, which is four days N. of Balkh, and 1½ S. of some extensive ruins of an old city named Thoor, said to be the largest in Turkistan :—burnt clay idols, walls eighteen yards thick, of polished stones without cement. It is at the S. entrance of a pass in the Thoor hills which run E. to W. or N. W. to S. E. from Shoobrisubz by Mapak mountains and Koh-i-pak, Shamror and Allghoor, the fort of Karbana to Falungir, and through the desert of Woormoor; wind S. to Thalukhar and S. to Khan Durra, and then E. along river Bhoongee to the Esh and Geth districts, where they join the Hindoo Koosh.

1. The Daha kash (or Akroo) rises at Dehan, a small fort at base of Ghoor mountains 1½ day to Nilung; thence N. E. to Khandak, a large but ruinous fort, where it is met by the Zuz, which rises at Shah kool one day W. of Dehan (which is one day from the first fort met on emerging from the Khilzye country, and from the mountain called Shah Shoorwa by Khilzyes and Nak by Therbas, from whose snows the Moorghab or Dorub rises); thence the united streams run N. N. E. to Ghoor—N. E. to fort Janbuk four days, N. E. 2½ days to fort Khasbin, two days N. E. to Soorbhwa; whence it in heavy

floods is able to cross the sand one and half day to Molbergan, where it falls into the Andi Shia.

2. The Andi Shia rises near Aboon and Killabeg, two days W. of Bamian, then runs N. W. to Auk, Pinchoo, Yooknoo to Nasbeen, where it receives a small stream, the Tanab (which rises at Killa-khoor three days W. N. W. of Bamian) ; thence N. W. to Thahsult, where it receives a small stream from S. W. called Awa; thence Peelkoo, Bulk and Bala, where it winds to N. and runs between the Yusuf range and the Thamoo hills; thence to Khroon, Bulkh-al-paieen, Lashar, Charkhund, and Oombsir, a large fort on W. bank one day E. of Ghoorzewan; thence by Dehkael, Boieen-i-kur, Oodook, where it receives a stream rising at Nasheb in the Thaa mountains ; thence N. to Hood and Derra Guz by Killa Shah, Mollbryan *(vide infrà)* to Pookool, where it begins to be exhausted in irrigation round Balkh, but in floods it passes N. N. W. of Balkh by desert of Now-shahak by Bahool, Fahish to Oomshurk.

3. The Khooloom or Korth has two branches, the most westerly rises at Naishuk, a fort two stages W. of Khara Khooth pass between Kabul and Khooloon; the other rises at Jabun two days E. of the pass; they unite at Meeran and run N. to Fazaamth; thence to Shuhk and Rooee, by Tahal, Koor Koorum, by Vaij and Saharbag, Shehmet, Siri Koond, Dara-i-pirdar to Heibuk, where it is much used for irrigation, and meet the Naizaab, which rises near Maham in the Foorkoo mountains two days from the shrine of *Nab*. From Heibuk the Khooloom runs N. W. to Kheloodurr, by Khoom the ruins of an ancient place ; thence to Pechoo, where it receives the Mahud, which rises near a shrine—Mahood ; thence by Zart, Ghuzni guk, Syed Shah Balumby pass and a fort of Neekkoor and Koolon river to which it is joined by the Noonooal, a small stream from the S. E. rising from Zeib one and a half day S. of Aubdauk. From Khooloom it runs N. to Zooloom, Shah Killa, Ghaur Hásh, where it falls into the Amoo four or five days N. E. of Balkh.

4. The Soorkhab has seven sources.

1. The most westerly of these is the Kai-i-Kahi, rising near the salt springs of Thook in the Foobut district, one day N. N. E. of the Doondaur Shikum Pass. Thence it runs N. E. to Kool, by Kai Murd, E. to Ushon Shah and Dooshauk, Kool Ali Baush Koonth, where it meets the Akáb, which has two branches. 2. The Theh

rising near Dhoonko of Doordam peak, passing Zaimoo and Chaukbik where it meets the easterly branch which rises near Shinwur, and passes Noor, Syghan and Oozanub. 3. From Chákbik the Akthel runs to Bash Kosmust, where the united stream runs E. to Koor Dul, Kazi Pir, where it meets the main branch of the Soorkhab, which rises by various torrents of the Koh-i-Babo. 4. About the Hajíguk pass, the main branch rises near the caves of Ookurbut two days W. of Bamian; thence E. by Kafirghar and Bushbuk Koh; thence N. to Mishuk, where it is called the Noosh; thence to E. of Akroo hills by Huzrut Shah Ali; meets the Duraz from S. E. to Kazipeer, whence it is called Soorkhab. Thence N. N. E. to Kafir Maz and Kaha Baz and Byrah, where it meets the Hoor, which rises among the snowy peaks of Kafir Loo; thence it runs E. one day, then turning N. W. to Poosh, W. to Kroon, where are hot springs; thence to Gee, where it meets another stream from S.; thence W. to Bysah, where it meets the Surkhab. From Bysah the Soorkhab runs N. to Isope, where it meets the Dako (which rises two or three days S. E. of Kunghan); thence N. or N. E. to Reeuk, where it receives the Taha, which rises from the Thadur pass two and a half days S. W. of Thool. These three streams are frozen during five months of the year.

5. From Neeak N. or N. E. to Nawar and Dhorrhee, where it meets the Oondoo or Inderab. This rises at the warm springs of Kooth two days E. of Thool, thence to ---- Geth, where a great part is lost in a subterraneous abyss; thence to Kishnaz, where it receives a small stream rising west of Thool,—to Noorial and Dooshee. Thence the Soorkhab runs N. E. to Shah Nanoo, a great shrine, with salt and bitter springs; thence to Oosl, Ghorighar; thence N. to Kith, it meets the Hooz (rising at a place called Ishoon); thence by the fort and through the pass of Bush to fort Khan Mirza by Kaum, Kimish; N. to Shah Beg and Koondooz just below which it runs into the Zoouk or Aksunn.

6. The Esh, Doolgeth, Oorgeth or Abigeth river rises a day's march S. of the Kafir city and caves of Esh and, collecting the waters from the adjoining Geths, runs N. W. to Shoone; thence to Ashur where it is joined by the torrent of Naoo (part of which is first lost in the Naoogeth); thence to Khoorrum where it is joined by the Bhohog.

7. The river called Bhoongee rises at Ooslot, a Maur fort N. of the great range and five days W. of Chitool; thence W. through the Maur country to Nouvahi Kaffir, where are three gigantic idols in caves, one said to be twenty-one times the size of nature. Thence by Dur or Durra Ooth, where there is a remarkable vortex and subsidence in the river Ooth; what is not swallowed up, joins the Bhohog; thence to Ooslut by the Usbec fort of Kran; thence Khoonroom, *(vide suprà)* having received the Esh N. W. to Ispo through mountains and uninhabited tracts to the pass of Durra Ishol N. W. to the brine-springs of Zee, N. to Durdan, Shah Donoz, where it falls into the Zohak, one day W. of Washi and Thaligam.

8. The Shahageth or Thal rises towards S. E. in the peaks of Maur-i-Moo; its two branches issue from the Durra Toork and Durra Faharang, and unite at Thang-i-Krai, near which are said to be lead and iron mines; these are now neglected and are four days W. of Boodookshun. Thence it runs N. W. to Shahgeth, a famous shrine of Kahika; N. W. to Zun-i-buk and Poorth Kra, where the Zain joins from S., rising also W. of Mahar-i-Moo; thence W. by fort of Tak to Hoon and Thalee Khan, and meets the Bhohog at Shah Oomoz, which is a short day N. E. of the shrine of Joh, formerly a Kaffir place of worship; thence N. W. to Wahi and Khanabad where the river is generally called Zohak; thence to Pithoor and Koondooz, where it receives the Khooloom (v. s.), whence it takes the name of Ak or Akserai; N. W. to Goomsur and Akserai; N. W. to Pathoor, Thaloom and Peer Shah Haj where it meets the Amoo.

9. The Guldarsh or Goolsind runs in the Pâk mountains one day S. E. of Thrain-koh and Moongam; thence N. W. to Kas Abi, Roobnea (four stages from Budukhshan) to Koouk, Koh-e-thog N. W. to Goolsin; thence to Zurbab, where it falls into the Zoon. This river is famous for the rubies found in its bed and neighbourhood.

10. The Zoon rises at Taioork, a place famous for jewels, one day N. of Moongham in the Pâk mountain, three days S. of Boodookhshan; N. W. to Nomah or No, the ruins of an ancient massive building one hundred yards square, and one hundred high, the first twenty yards built up with well polished blocks of stone, about two yards square. It is not quite square, the North side having an angle in it ⍓ so—the circumference is four hundred and twenty yards, and

it is half a mile from the river on S. bank, and three stages S. of Boodookhshan; numerous clay idols are found in the ruins around. Thence the river runs to Wambik where it meets the Tha; thence N. W. to Peeri Moor, a famous old shrine now in ruins; thence to Futhook, where it receives another stream from the S. called *Be ab.* Thence N. W. to Zur or Zurbab, where it meets the Goolsind (v. s.); thence N. to fort of Zoon, where the river is called Aizoon; runs through hilly barren tract to Boloo, an old fort with extensive ruins on the top of a high hill—there are large springs and a place of pilgrimage there; thence N. W. to Weisoon, where it falls into the Boodookshan or Aiksah river.

11. The Aiksah or Kauksahee rises near Thool, a hill fort three days N. of Dharaheem, whence it runs S. to Komu, winds W. to Naum (where there are coal-beds and iron), thence to Erg and Koanch, where it meets the Gaihi (which rises one and a half days to the N. in three small lakes called Ghâl, surrounded by the Kash hills). Thence the stream receives the name Khah, and runs S. and S. W. to the pass of Dur Bohoom, where it meets the Nu-e-choor (which rises in the E. at Ghâz in the Dharabim mountains two stages W. of Dharahun, and thence runs by the caves of Aurooch, near which are good lead-mines,) thence by Peus fort to Dur Bohoom; thence E. to Yoath where it is joined by the Yontee (rising in the mountains of Kalkroosh, passing Maha ruins one and a half stage W. of the Ghal lakes). A few miles lower at Shei, it spreads into two lakes called Ehesh, on the N. bank of which is the hill in which are the caves of Esh. Thence the Khae runs N. W. to Háthus, where it is joined by the Hem, (which rises in the mountains N. of Chitral at Oogurk); thence N. W. to Yahab, to the lake of Noosh where it turns E., and through the Shoolee mountains and pass of Dâd, to Muz where it meets the Mooz (rising in Kalproost mountains and has a S. W. course through the Shooli range). Thence N. W. to Ooshuk where it is called Aiksah,—to Boodookshan, where it is first called Khaksah; two miles N. W. of the city, it is joined by the Shohi which rises N. E. in the Shoolee mountains. Thence it runs past the ruins of Eshka Kall where it receives the Shood, which runs in N. E. at Shush in the Shoolee mountains, three days N. E.

The Shood from Sheesh runs along the Shooli range to Pauk

where it is joined by the Ghanooz (rising in N. W. out of lake Ghanooz) ; thence S. to Maieel to Fort of Ushk or Eshk (v. s.) ; thence N. W. to Shauluk, three days through barren regions to Fort Oorg, to Goorp where it is joined by the Goorp from N. W., rising in Mahash mountains at Savrek, three or four days W. of Bolor (the Mahash is a northern continuation of the Shoolee mountains) ; from Goorp the Khauksah runs N. W. to Oomar, where it is joined by the Bhahath, which rises E. at Thei-i-Bolor and runs W. through the Mahash and Shoolee mountains through the Malk pass, through the barren Shoolee district to Geheez, and thence to Oomir, (v. s.) Thence the Khaksah runs through a hilly country to the fort of Kan-ook, where it is joined by the Kauksoo which rises near the ancient city of Shoh which is about four days N. N. W. from Bolor and two days W. N. W. from Ghâr-look ; thence the stream runs to Areekuk or W. base of Shoolee mountains S. W. to Peor, where it receives a small stream from E. ; thence S. W. to Kaul where it receives another stream (which rises near Nokoo and runs due west through the pass and by the fort of Akm, and so W. to the Kauksoo, which runs on through an almost uninhabited tract to Khaksah, (v. s.) ; from Kanook the Khasal now called the Boodookshan continues N. W. to Abba Nooz,—to Weizoon where it meets the Goolsend or Aizoon ; thence W. N. W. to Warhook ; W. to Khoja-haur where it meets the Loorkhalas, and runs N. W. to Boolgwa and Yayaan-ossa where the Shamoo or Bolor joins it.

12. The Shamoon or Bolor rises at Ooknumu on the north side of the Kalkroosh mountains, and about two days' march S. from Bolor ; thence N. by Bolor and through its valley to the pass of Durraroz, on which are the old and large ruins of city and fort of Roz ; thence to Boorglass, another ruined city and fort ; thence N. to Shoshun where it is joined from E. by the Shun stream, rising at Pebhaik three days E. of Bolor, and running thence by Dazee to Shosun. (v. s.) Thence the Shaumoon proceeds to Barad, where it meets a stream so called, rising two and a half stages E. at Prahoo ; thence N. W. to Gauzool and Ghaurlook where it is joined from the S. by the Koho rising three days march S., at mineral springs near Kohoo a day S. of Khazur ; N. to Talan an Akâ fort one and a half day east of Shoh. This fort is considered impregnable, being situated

on the tops of inaccessible peaks ; it is as old as Shoh ;—N. to Cheoor about ten miles N. E. of Shoh where it receives the Shoh ; N. W. to Oolook, through the Durra Drewas pass, and N. W. to Aleek where it meets a stream which runs along the pass from Thooroo at its eastern extremity ; thence to Boorth, a Musalmán shrine, below which it receives the Khokhoom, rising E. N. E. in Kok, a fort in Bolor mountains N. to Nath, where it spreads into a lake called Boom Kull by Akaas, and Disrik Kull by Mahomedans. The river here forms three channels—the most northerly pass Boom Baimeer, winding round to W. to Esurk, receives a small stream of that name from N. rising at Nashh, and receiving after heavy rains the overflow of the Kara Kul lake, and running through the pass of Roouk to Esurk ; thence W. and S. W. by Zath and Khybut where it receives the Zath from N., rising in the Akaa range two stages from the lake Riaz Kul. Thence the Bolor runs S. or S. S. W. clearing the great range at fort Shameek, and thence S. W. to Wackund, a large Usbec fort on W. bank ; thence to Peeraz, where it is joined by the Roon from the E. rising at Hazur in Shoolee range two days' march E. of Walfo ; thence S. W. two stages to Akanoon, where it is joined by the Thooz, which rises a stage west of the Ghar lake at a marsh called Seosoo ; thence it runs N. W. through the great Shoolee range S. W. of Shoh W. to Preakgau, to Kheal or Keelâk, W. by Irsh to Akanoon where it meets the Bolor : thence the Bolor runs S. W. to Asoo, Yarga Oop, where it meets the Soorkhab, and thence they flow together to S. W. by Chuktee and Khoojawur, where they fall into the Ab-i-Ma or rather being there joined by the Boodookshan take the name of Abi Ma or Amoo.

13, 14. The Soorkhab has two main branches rising N. E. of the Nonaut Kau peak ; runs thence by Malpoort, where it meets the Abkoor from lake Khiangkul ; thence S. and W. to Shinwar, where it meets the Oosh from E. from lake Kara Kul ; thence S. by Khara Tagoon, S. W. to Auspek, where it meets the Numa rising at Taux to N. W. ; thence S. by Nahamoot, Boolgwan, Yarghan and Ooppa, where it meets the Bolor river.

15, 16, 17. The Kaffir Noshan runs a day's journey to the S. of the pass of Dostara under the peak of Nonaut Kaw. The Hoon

rises at Zeenoo, runs thence to Taux where it is joined by the Molpooth rising in mountains of the same name, passing Shoon and Kaffirnoshan; thence S. to Shiroog where it is joined by the Zerâb or golden river, which rises also to the N. E. in the Malpooth mountains. From Sheroog to Hazar and Shadman, and running thence, I met the Amoo at Tahoo Thun.

18. The Dawoo or Thoupalak rises at Raos about two stages W. of fort Oostam; thence runs through the Karatagh mountains by Kibbot, whence it turns S. through the pass of Rubuko by fort Ko, Kurm, Oora Dehi Noo, S. to Pelank through the pass of Dur Abdoola in the Thu range to Af, where it meets the Amoo.

19. The Zorab or Kootsind rises in the Komjuk mountains one and a half stage S. of Moabooll; thence runs S. to Soorda, about five miles E. of Bayesoom, S. to Killa Yoosuf, by Zauroock, and Sydabad, S. to Peer Koh by Ziarut Shah and Thekâ, Islamook, where it winds W. and S. W. through the Thoo range to Thoor where it decreases in the sand and feebly reaches Nohak. In times of flood its waters thence run S. W. to Choorkaba on the Amoo three days W. of Thermaz.

Notes on the Yarkund and Oxus.

The branches of the Yarkund commencing from the most easterly are—

1. The Kroo, rising at Pomboone in the Yagni Dhawam range, joins the main river at Yark fifteen miles south of Yarkund.

2. The main branch or Yarkund rises at Khai-i-tang in the Kara Khoom mountains, one day S. of Seraigooth, thence N. to Seraigooth, thence N. W. to Palkoom, and meets the Sahoon at Khakaloon.

3. The Sahoon rises at a place of the same name, two days W. of Seraighot, joins the river at Khakaloon. Thence N. W. to Shoonwak-Humlang, where it receives the Khoolkhan.

4. The Khoolkhan rises at Koolkhan in Karakhorum mountains, runs through the Asmoh and Kirghiz, and reaches the river at Humlung one and a half day above Yarkund, N. W. to Khoolan thence W. N. W. through the Asmoh and Kirgiz low forests to Assa, where it is joined by the Anashoog, which rises in the Peeloo

mountains one day S. of fort of Anushoog, and runs N. by Peeloo fort through the Ashahoon pass, and the districts of Mángáun, to Asa. The united river, now runs N. W. through the Ame district along S. of Yagni Dhawan range to Yagne, where it meets the Dowlutsooeh river, which itself has four branches.

1. The most easterly of these is the Ashoohun, which rises West of the Ashoohun pass; thence through Dowlutsooeh; meets the (2) Hautehkoot, which rises mainly from Lake Toong, a day's march N. W. of Hautehkoot S. W. to Tamor; then turns E. and S. E. to Manlook, then to N. and N. E. to Yahoog, where it meets the Ashoohun, two and half days, N. E. of Hautehkoot; thence N. and N. E. by Polum two days N. N. E. of Yagne, where they meet the Selekute.

3. Selekute rises at Jam one day N. of Poosht-e-Kaus, thence by Selekute, and thence E. to Lake Zál, where the Dhan meets it from the S. also, rising one day N. of Pooshtukar. From Lake Zal E. S. E. to Polum, it meets the Dowlutam, which thence continues E. one and a half day to Maloo, where it meets the (4) Aushak, which rises W. of Kashauk at base of Yagni Dhawan, thence through great barren plains to Malor. Thence the Dowlutsud runs E. through the Mangan range, and joins Yarkund at Yagni.

The Yarkund thence runs N. W. three days to Aneuchan where it receives the Chimb, which rises one and a half days more W. thence. Then the river forms an angle and runs N. E. by Ashelook to Yarkund.

Note on the Ranges and rivers N. W. of Indus and Gilgit.

The 1st or most northerly is the valley of Pinghit or Ustikhan or Zairauneh, where the E. branch of the Kanka rises.

2. The Spung valley, an easterly continuation of the last; in it is the Spung lake and source of Ankahoo.

3. The large Peeloo valley.

4. The Ashnoog, S. E., and divided from the East by the Anaushoog mountains.

To the south of these valleys lies the Peeloo range, whose name however varies in different parts of its length. Most north-westerly it is called Pingut, then Spung or Makoo, then Peeloo, and the easterly portion Meúl Ho or Anaushoog S. E. of that Hunzye, and further on Khangram or Bulti, sinking away into the Oskardo hills.

To the uorth, these valleys are bounded by the Tso-hung-lung or Kara Korum mountains, which goes by various names likewise. At its west end, where it joins the Bolor mountains, it is called Kânchgir. East of that Poosht-i-Khaur E. S. E., thence Appro (in which there is a large fort). To E. thence, the Great Spung. Thence eastward Ashahoon or Ashur ; thence eastward, Thalshool or Krana. Krana itself is a beautiful peak, remarkable for striped ribbon jasper, olivine and chrysopras pebbles found in the beds of its streams. From Krana a considerable range runs down to Bullisthan called Kai-e-Kah. Here are beds of coal uear the ruins of an ancient eity called Shah Taslif, or anciently Liháf or Leefoo.

The Kai-e-leh is mostly slaty formation. In it are marble quarries, and alum and salt are extracted from some places in small quantities at the easteru base, and large quantities of borax : Leefoo is four or five days due north of Iskárdo.

From Krana eastward the range is called Kara Kurum to the souree of the Chorere river, whence it takes the name of Thosung-lung.

The Bolor mountain rises almost N. and S., commeneing in the north of Zálnoohee in the Joolkal distriet, which is four or five days south of Balook Bara, a great lake ; thence south by the fort and district of Zoonáu, which lies to the N. E. of the Pingut range, treading N. W. or S. E. two marches and 8-9 Long. at its south, it is called Poosthekán. To the north it is bounded by the Yoog Uhoog mountains, which commences at Pashee two days N. of Julmookhee and seventeen S. of Balook Bhara ; it tends S. E. and joins the Kara Koorum near Hatch Kooth. N. and E. of Uhoog is the valley of Poosh bouuded to N. by a spur of the Yagnee Dhawan mountains, whose westerly extremity commences at a day's march or a little south of Ausgess ; thence it runs S. and S. E. to Othe, theuce to Koum and Kharakool, then turning more easterly runs to the S. of Ooshkumnak and Dooushoo ; (mostly uninhabited save by a few wandering Akaas) : thence it runs E. S. E. to Anewchán Asa Mahazâr, theuce most southerly to Wahon, Munaham and Khamkoom, wheu it dies away ou the plain of Yacha Thung.

5. The fifth valley is Naw Aloou or Ooloor, due south of Pingut, and divided from it by the Zinpanoocli range. It belongs to

Muhammedan chiefs, but is mostly inhabited by Bolorees and wandering Shoolees.

6. The Darahm valley due S. of Lat, and separated by the Dormah range, it is one of the best cultivated of these valleys, and belongs to independent Muhammedan chiefs.

7. Rewanshoor valley, small, to E. and S. E. of the last, on north bank of the Gilgit; it is, though small, well cultivated, and gives good produce, especially wine and fruit.

8. Booloo or Boolooper, a narrow slip, about two days' journey in length, from the Gilgit river to N. E.

9. Gilgit Proper lies on both sides of the Gilgit river from Booloopor to Ooster and thence along N. bank to Shooghoor on the Indus.

10. The Tangoot valley, considered a dependency of Gilgit, is divided from the Bulooper by the little Gilgit range.

11. The Hunzaye may be considered as an eastern continuation of the last, from which it is divided by a small bare rocky range called Hai cha. It runs east and adjoins the Bulte Province, whence it is separated by the Hunzaye part of the Peeloo range.

12. Mâr drâl Choo or Drale to N. and N. E. of Hunzaye, whence divided by the Peeloo. It is a dependency of Baltistan, and bounded on N. by the Karakoon, and E. by Kai ekah mountains, and ends in Iskârdoo proper. The southern portion is most bare, producing nothing but borax. The Koobeloo district commonly called Lubra or Nubra or Nobra, may be considered as a large valley bounded by the Kara Khoorum mountains on N. or W. by Kai-e-Kah, S. by Indus and Kai-e-Kah, E. by the Nubra range; two northerly branches of the Indus run through this. The most westerly is the Koobeloo, which rises by two small branches in the Kara Koorum mountains. The most westerly of these is from a lake called Kaufeloo. The other is from large springs two days' stages from the lake, after these two branches run south to Nishtung where they meet, and the river thence passes the fort of Fo, thence turning W. for three days breaks through the Kai-e-Kah and joins the Indus at Khanthool about one and half day E. of Ooskardo.

The other river—the Cheoera rises in the Kara Khoorum at some large spring one day east of those which are the E. sources of

Koobeloo. Thence it runs S. along the base of Loobra mountain S. W. through Loobra plains and meets the Indus at Budgnak about twelve miles below the fort of Hemap.*

Early Hindústány Poetry.—By A. Sprenger, *M. D. Secretary Asiatic Society.*

In a former number of this Journal Vol. 21, p. 513, the Rékhtah verses of Amyr Khosraw have been adverted to. I have since met with an important passage in the Tadzkirah of Mohammad 'awfy, for which he collected materials in A. H. 600. He says in speaking of Sa'd aldawlah Mas'úd:

اگرچه مولد او همدان بود اما چون همه دانی کار اورا در بلاد مشرق طراوت داد و ذکراو از فضلاء این عهد بر آمد و در کتب تواریخ اورا از جملهٔ شعرای این بلاد داشته اند بدان سبب ذکراو دراین باب آورده شد ونیز حق او آن بود که اورا در زمرهٔ صدور آورده شدی فاما چون اشعار او از جمله شعرا زیادت است واورا سه دیوان است یکی بتازي و یکی بپارسي ویکی بهندوي بدان سبب اورا درسلك شعرا منخط گردانیده اند

"I have mentioned this poet in this place (i. e. among the poets of Ghaznah) though he was a native of Hamadán, because providence has so willed it, that he should distinguish himself in the eastern countries, and his life is connected with that of the learned men of that age, and because in historical works he is considered a poet of Ghaznah. He had a claim to be classed among the nobles who have written poetry, but he has written more poetry than most professional poets, having left three Dywans, one in Arabic, one in Persian, and one in Hindúy, and for this reason I mention him among the poets."

Khoshgú, Vol. I. No. 34, confirms this statement:

امیر خسرو دهلوی در دیباچه غرة الکمال اورا بسیار ستوده و گفته که درسه زبان عربي فارسي و هندي دیوانهای ضخیم دارد

"Amyr Khosraw of Dilly (died in A. H. 725) praises him very highly in the preface to one of his works, and says that he has written three thick Dywáns, one in Arabic, one in Persian, and one in Hindy."

* The orthography of the MSS. as far as it could be made out has been carefully preserved. Eds.

The terms Hindúy and Hindy in these two passages mean the language in use among the Musalmáns of India. I need hardly say that the terms Zubáne Urdú, court language and Shi're Rékhtah are very modern. The former of these terms is but very rarely used by natives of India and the latter is already obsolete, the usual term even now applied to the language and poetry which we call Hindustány is Hindy, and always has been "Hindy." The very name of "Dywán" which is given to Mas'úd's collection of Hindustány poetry is a guarantee, that it did not consist of Slokas, Kabits, and Dóhrás, but of Mathnawies, Qaçydahs and Ghazals written in the Persian character.

As to Mas'úd himself. His name is Abú-lfakhr Mas'úd, a son of Sa'd and a grandson of Salmán and his titles were Sa'd aldawlah and 'amyde ajall. By the latter of these titles, he is named in a poem which Sanáy has written in his praise:

ای عمیدی که باز غزنین را صورت و سیرت گلشن کرد

The statement of Mo*h*ammad 'awfy that Mas'úd was born in Hamadán is supported by the author of the Haft Iqlym, and he says himself that his origin اصل was of Hamadán. But it seems that he means merely that his family was of Hamadán, and that the above two authors have been misled by this statement. Dawlat-sháh believes that he was of Jorján, but Taqyy Káshy shows that he was born at Ghaznah and, surrounded by Hindú slave women as the Mo*h*ammadan nobles of Indian courts always were, it is not unlikely that the language of India was his mother-tongue.

His father Khwájah Sa'd was a noble at the court of Qábús of Dylam, the son of Washamgyr. He left Jorján and went to Ghaznah for reasons which are not recorded. Mas'úd was born towards the end of the reign of the successor of Ma*h*múd and grew up at the court of the Ghaznawides, and being a great financier he attained to the highest distinctions and was made Mostawfy and Munshiy of the kingdom. But he had his downfall, and he had the misfortune to be imprisoned in the fortress of Náy نای for twenty-two years. The cause of his imprisonment is variously stated. Some say that he was arrested by order of an Amyr (military leader) of the name of Qomáj, when on a deputation to Systán and Zábulistán, because the mind of the King was poisoned against

him, owing to some suspicion against his fidelity in the discharge of his duties. But Nitzámy 'arúdhy states in his work which has the title of چهار مقاله *apud Taqyy Káshy* that Sayf aldawlah Mahmúd a son of Sultán Ibráhym was accused of having formed a plan of joining the court of Malikshâh, and that he was (in A. H. 472) cast into prison on this account, and put to death in it. His friends, the most intimate among whom was Mas'úd, shared his misfortunes. Mas'úd however regained his liberty after twelve years, but subsequently he had to endure eight years more of incarceration owing to the roguery of Abú Naçr. When he regained the second time his liberty, he withdrew from the world and devoted himself to the service of God. He died in 525. He was acquainted with many of the earliest Persian poets, most of whom sung his praise; among them are Abú-l-Faraj Rúny, who was his teacher, Mokhtáry of Ghaznah and Mo'izzy. Unfortunately none of his Hindústany compositions have been preserved, though it is very probable that they were still extant when Amyr Khosraw wrote. Taqyy Káshy has seen his Persian Dywán which contained about six thousand verses, and he has embodied no less than 4,650 of them into his Tadzkirah.

Report on the Geological Structure and Mineral Wealth of the Salt Range in the Punjaub; with Maps, Sections, &c.—*by* Andrew Fleming, *M. D. Edin., F. R. S. E., Assistant Surgeon, 4th Regt. Punjaub Cavalry. In charge of the Geological Survey of the Salt Range in the Punjaub. Season* 1851-52.

(Communicated by the Govt. of India.)

(Concluded from Page 368.)

On the Korana Hills.

From the central district of the Salt Range and apparently running parallel to it, an isolated barren range of hills called Korana is seen rising out of the plain of the Jetch Doab or district between the rivers Jhelum and Chenab.

The highest point of this range is about forty-six miles S. S. W. of Pind Dadun Khan, and about twenty-four miles south-east of the civil station of Shahpoor.

When in the Salt Range near the latter place, in the month of January, I took the opportunity of paying a flying visit to Korana,

which, from the abrupt way in which at a distance it appears to rise out of the level alluvial plain, I supposed might turn out to be of volcanic origin, and might assist us in arriving at a conclusion as to the agency by which the strata of the Salt Range were elevated into their present position.

From the Jhelum to Korana is one uninterrupted alluvial plain called the "Bar," about six hundred feet above the level of the sea, thickly covered with a jungle of caper, pelu and mud, through which, from Shahpoor, a four hours' ride brings one to the foot of the hills. In this district there are but few villages, and the scanty population consists chiefly of thieving Beloochees, who, with their flocks of camels, bullocks and buffaloes, wander about the Bar, remaining in any one place only as long as food and water are procurable. For the latter, they are chiefly dependant on rain which is collected in holes or tanks dug out of the alluvial soil.

Two wells have been dug in the interior of the Bar on account of the great depth at which water is reached and its generally saline character.

The aspect of a range of hills which Korana from a distance presents, gradually disappears as we approach it, and we were not a little surprised to find that it consisted of a succession of isolated ridges of stratified rocks of various sizes, running parallel to each other and rising abruptly out of the plain, studding this over a space of some six or eight miles, and extending towards the Chenab in the neighbourhood of Chineout.

As we could only devote one day to the examination of these most singular rocks, our attention was devoted entirely to a portion of the principal ridge to which all the other smaller ones are apparently similar.

The Korana hill, on the summit of which is the residence of a highly venerated Fakir, consists of a ridge of rock stretching from north-east to south-west, and about two miles in length. By the Thermometer, its height is estimated at nine hundred and fifty-seven feet above the plain at its base. It presents a steep slope to the north-west on which a few stunted Phoolahee bushes have taken root, and an escarpment to the south-east. It has a peculiarly black volcanic appearance.

The ridge is entirely formed of a coarse brown ferruginous quartzose sandstone alternating with beds of a greenish quartzite, which in many places passes into a siliceous clay slate. These beds are all distinctly stratified and dip to the north-west at an angle of from 40° to 45°.

The sandstone is traversed by numerous veins of white quartz containing masses of rich hæmatite iron ore, which do not seem to have attracted at all the attention of the natives as a source of iron, although it can be obtained in considerable quantity, and ought to yield from seventy to eighty per cent. of metal.

Filling small cracks in the sandstone some small specimens of pyrolusite or peroxide of manganese were obtained. This, when powdered and treated with hydrochloric acid, gave out chlorine in abundance, and when fused with borax in the oxidating flame of the blow-pipe gave an amethyst-coloured glass. It occurs in thin detritic laminæ of a steel-grey colour with a strong metallic lustre, and which exhibit a black streak. This valuable mineral was not detected in any of the quartz veins; but as it very generally occurs associated with hæmatite, it is not improbable that it may be found. It is nowhere an abundant mineral, and as it is in great demand for the manufacture of glass and for bleaching purposes, and fetches a high price in the market, it would be of great importance were a workable lode of it discovered.

No fossils could be detected in any of the strata which, from their mineral character, we are disposed to reckon as lower Silurian or Cambrian, the lowest of all fossiliferous rocks and subordinate to the salt formation of the Salt Range.

From the general parallelism of the Korana ridges to the Salt Range we think it most probable that at one period, the latter had extended in breadth across the plain of the Punjab, from which, by disturbing agencies and extensive denudation, the softer strata have been removed, leaving only the harder and quartzose sandstones of Korana as monuments of its former extent.

From Korana eastward to the foot of the Himálayas at Roopur we are not aware that a single rock occurs; nay, we believe that a traveller might search in vain even for a pebble in the sun-baked alluvial plain of the Punjab Doab.

As far as we have observed no out-bursts of plutonic or volcanic rocks occur in connection with the Korana strata, but the injection into, what probably were, rents in the sandstone, of pure quartz veins containing metallic ores, indicates their having probably been subjected to igneous agency. The limited time we had to spare did not permit of a more extended and careful examination of so interesting a formation, barren and uninviting though it appears to the eye of any one but a Geologist.

In conclusion we may remark that quartz vein penetrating slaty strata similar to those of Korana, have, in almost every part of the world, been found to be the principal source of the richest metallic ores. Gold ore is almost always found in quartz veins penetrating the most ancient fossiliferous and metamorphic strata, but as that metal is invariably found near the surface of its vein-stone, mining gold has never turned out so profitable a speculation, as washing its "dust" from the debris of its vein-stones in the alluvial deposits at the foot of auriferous ranges. We never have heard that gold was ever seen in the alluvium at the foot of the Korana hills, but the locality is one where we should expect to find it.

The metamorphic strata of the western Himálayas towards Cashmere, where they are so extensively invaded by igneous rocks, are certain to be found, when duly examined, to yield rich metallic ores. The difficulties attending investigations of the kind in such elevated localities are, however, very great. Hitherto the field may be considered as untrodden.

Approximate heights above the sea level of localities in or near the Salt Ranges referred to in the accompanying report, calculated from the boiling point of water.

Locality.	Approximate height: feet.	Remarks.
Mount Tillah,.....	3,277	Pucca Tank on Summit.
Gurjok Hill above Jelalpore,.....	1,882	
Plain at Jelalpoor,.....	619	A little W. of village.
Plain at Jutana,.....	619	
Pind Dadun Khan,.....	608	Plain near Fort.
Top of Koossuck Fort, ...	2,547	At the Musjeed.
Tober Musjeed, ...	2,141	

Keurah Deputy Collector's House,	1,183	Built on Salt Marl.
Chooa Leydun Shah,	1,871	Fakir's Bagh.
Kuringuli Mount,	3,234	
Kutass,	2,155	Field W. of village.
Dhur Range,	3,130	High Point, 2 miles W. of Dehriala.
Noorpoor,	2,288	Beside village.
Mount Sikesur,	4,990	Old Temple on Summit.
Oochalee in Souc Valley.	2,404	A little above Salt Lake.
Kutha Moosoul,	627	
Nullee,	683	A little below village.
Kheree Hill above Nullee,	3,090	
Chideroo,	660	Below village.
Zamanee Hill above ditto,	2,602	
Mooza Khail,	777	Plain between Town and Salt Range.
Maree on the Indus,	633	
Maree 2nd Observation,	636	
Top of Maree Salt Hill,	1,196	An Old Temple.
Summit of Dinghote,	2,746	
Bahadur Dok village,	4,493	Right bank of Indus above Kaffir Kote.
Kaffir Kote Range,	1,602	High Point N. of Old Fort.
Mount Drengun,	3,710	Trigl. Survey Station.
Besharut village	2,884	Below Tank.
Mount Diljubba,	2,872	Trigl. Survey Station.
Jhelum Station,	671	
Summit of Korana,	1,565	Near Monastery.

The thermometers used in obtaining the above results are made by Newman, and furnished from the magazine of Fort William.

It is to be regretted that they were dispatched without their zero error being accurately ascertained, by comparison with an authentic standard thermometer or barometer. They are divided into $\frac{1}{2}^{\circ}$ divisions, which can be read off to $\frac{1}{4}^{\circ}$ with tolerable accuracy.

Having fixed the height of Pind Dadun Khan as six hundred and eight feet by the barometer, we were enabled thus approximatively to determine the amount of error in the thermometers, and to apply it to correct our results.

In this way they come wonderfully near to the heights obtained by barometric observations.

The small liability to accidents and the portable character of the mountain thermometer as well as the ease with which, in almost every situation, an observation can be taken, render it a most invaluable instrument to an Indian traveller.

The tables we have used are, we believe, those of Prinsep as given in Colonel Jackson's useful book entitled "What to Observe."

Approximate Heights above the Sea Level of Localities in or near the Salt Range, referred to in the Accompanying Report calculated from Barometric Observations.

Date.	Locality.	Hour of Observation.	Barometer unreduced, corrected for capacity and capillary action.	Attached thermometer.	Detached thermometer.	Approximate Height in feet.	Remarks.
Dec. 25th, 1850.	Summit of Mount Tillah, ...	1 P. M.	26.806	57	54	3,270.88	The Barometric observations from which these results were calculated, were made by Mr. Purdon 1st Asstt. previous to my joining the survey.
Jan. 9th, 1851.	Dundhote, ...	1 P. M.	27.701	60	58	2,351.12	
,, 27th, ,,	Old Temple summit of Mount Sikesur, ...	2 P. M.	25.080	62	60	5,128.9	
Feb. 20th, ,,	Kalibag below the Town, ...	2 P. M.	29.380	70	68	641.8	
,, 24th, ,,	Summit of Kalibag Hill, ...	Noon.	27.809	81	74	2,356.68	
,, 28th, ,,	Kothee entrance to Chichalee Pass, ...	8 A. M.	28.755	64	64	1,147.59	These results are probably too high, as the Barometric column was unnaturally depressed before a gale.
,,	Highest point of Chichalee Range N. E. of Kothee, ...	1 P. M.	26.50	75	72	3,628.80	
March 3rd, ,,	Maree on the Indus, ...	7 A. M.	29.383	56	56	609.3	
,,	Temple, summit of Maree Salt Hill,.....	8 A. M.	28.841	68	66	1,221.1	
,, 8th, ,,	Nummul N. side of Salt Range,	9 A. M	28.900	72	74	1,173.75	
,, 9th, ,,	Dok N. W. flank of Mount Sikesur, ...	11 A. M.	28.179	74	74	1,950.63	When these observations were made, weather was unsettled and cloudy.
,, 10th, ,,	Old Temple (Lingasun) Mount Sikesur, ...	Noon.	25.104	69	68	5,221.00	
,, 15th, ,,	Moosakhail Plain N. E. of Town,	9 A. M.	29.233	63	63	706.22	
,, 21st, ,,	Arub Village, ...	7 A. M.	27.532	60	61	2,233.	
,, 21st, ,,	Old Temple summit of Mount Sikesur, ...	Noon.	24.939	62	60	5,136.9	

Table of Approximate Heights calculated from Barometric Observations—Continued.

Date.	Locality.	Hour of Observation.	Barometer unreduced corrected for capacity and capillary action.	Attached thermometer.	Detached thermometer.	Approximate Height in feet.	Remarks.
Nov. 14th, ,,	Jhelum, Cabin of "Conqueror" Steamer, ...	10 A. M.	29.368	60	60	684.5	For this and the following Barometric observations I am indebted to the kindness of Lt. Grounds of the Indian Navy, who was engaged last cold season in a survey of the River Jhelum. His Barometer was a perfectly new Newman's Patent Mountain Barometer in excellent order, and was suspended in the Cabin of the "Conqueror" River Steamer, about 6 feet above the level of the water in the Jhelum.
,, 7th to 16th, ,,	Ditto ditto (mean of 10 observations), ...	10 A. M.	29.370	63	63	671.2	
Dec. 25th, ,,	Pind Dadun Khan "Conqueror" Steamer, ...	10 A. M.	29.519	60	60	616.11	
,,19th to 25th, ,, ,,27th to 31st, ,,	Ditto ditto (mean of 12 observations,)	10 A. M.	29.514	59	59	607.9	
Jan 21st, 1852.	Shahpoor "Conqueror" Steamer (mean of 4 observations,) ..	7 A. M. to 2 P.M.	29.576	55	54	514.02	
,, ,,	Shahpoor, ditto ditto, ...	9 30 A.M.	29.576	50	50	Height of Korana above the river Jhelum at Shahpoor.	This observation on Korana was taken from an Aneroid, which had been previously compared with Lt. Grounds' Newman's Barometer.
,, ,,	Summit of Korana Hill, ...	9 30 A.M	28.620	54	54	911.15	
,, ,,	Ditto ditto ditto, ...	9 30 A.M.	28.620	54	54	1,469.4	
,, ,,	Plain at Base of Korana (mean of 2 observations), ...	7 A. M. 1130 AM.	29.370	52	52	Height of Korana above plain at its base.	This observation was made on Aneroid, and was subsequently corrected to Barometer.
,, ,,	Summit of Korana, ...	9 30 A.M.	28.530	54	54	803 94	These observations were made on Lt. Grounds' Aneroid.

In calculating the heights I have used for sea-level observations those recorded in the Surveyor General's Office, Calcutta, as published in the Journal of the Asiatic Society. Provided with one instrument, this was the only course I could adopt. Galbraith's Barometric Tables, which are considered to be very accurate, were employed, and their extreme simplicity is a strong recommendation in their favour.

The instrument employed was a Newman's mountain barometer of the latest and most approved construction, furnished from the Arsenal of Fort William. It was safely conveyed from Calcutta to Lahore, in November 1850, attached to a Palki, and from thence was brought on to Maree on the Indus by Mr. Purdon, from whom I received it in the middle of February 1851. There was then but little leakage, and its indications seemed accurate until towards the end of March, when it commenced to leak very much and became quite untrustworthy. On examining into the source of the leakage I found it proceeded partly from a crack which had formed in the upper wooden part of the cistern, and partly from the side of the tube where it passed into the cistern; several plans were tried without avail to stop the leakage, and at last the mercury escaped to such an extent, as to admit of air passing into the tube.

By the contact of the escaped mercury with the solder which connected the vernier to the arm of the rack which moves it up and down the scale, the vernier became detached, an accident which never could happen if the arm of the rock and vernier were made out of one piece of metal. It is somewhat strange that an instrument-maker of Mr. Newman's celebrity, should not have guarded against the possibility of an accident, such as I have recorded.

In manufacturing mountain barometers for use in the very dry climate of the north-west provinces of India, it would be highly desirable that the wooden part of the cistern of Newman's barometers should be either entirely dispensed with, or be constructed of some thoroughly baked dry and tough wood. I very much doubt, however, if any wood will stand without cracking, the influence of the sun and hot dry winds of the Punjab in March, April, and May.

Another barometer of an old pattern without even a rack adjustment of the vernier, and set in a round mahogany case, which was

received in December 1851, on being taken out of its packing case appeared in good order. After standing in its leather-case for a day in my tent, its mahogany case warped so much as to bend forward the scale (metal) and impede the movement of the vernier. The first day I had occasion to take this instrument out, though carried with the greatest possible care, it leaked so much as to render the results obtained (in the absence of any instrument for comparison) utterly valueless. It is surprising that such an instrument should have been sent all the way from the Arsenal of Fort William to the Punjab for survey purposes.

A little more care in the selection, and speed in the transmission, of instruments required, would save parties engaged in scientific works in the N. W. Provinces from much trouble and disappointment.

List of specimens submitted to Government illustrative of the Geology of the Salt Range, &c. &c.

No.	Name.	Locality.	Remarks.
	Deooman Rocks, &c., ...		
1	Red Gypsum Salt Marl, ...	Pind Dadun Khan.	Contains Carbonate of Mag.
2	Metamorphosed Argillaceous rock with radiating crystals of Tremolite ? in patches on the surface of the Marl, ...	Pind Dadun Khan.	
3	Amygdaloidal variety of No. 2 with Geodes of Talc, appears like a metamorphosed sandstone, ...	Noorpoor.	
4	Variety of ditto ditto,.....	Pind Dadun Khan.	
5	Geodes of Talc in No. 3, ...	Noorpoor.	
6	Flesh-colored crystalline Gypsum.	Kerah Salt Marl.	
7	White Gypsum with Rock crystals.....	Maree Salt Marl.	
8	Ditto with crystals of Iron Pyrites.	Khond.	
9	Reddish Rock Salt, ...	Pind Dadun Khan.	Most esteemed variety.

List of Specimens, &c., continued.

No.	Name.	Locality.	Remarks.
10	White Rock Salt, ...	Pind Dadun Khan.	
11	Glass Salt, ...	Kalibag.	
12	Old Red Sandstone above salt Marl, ...	Baghanwalla.	Is hygrometric and Magnesian.
13	Variety of ditto ditto, ...	Jubbee.	
14	Grey Argillaceous variety,.....		
15	Greenish Schistose sandstone with carbonaceous markings,.....	Chederoo.	
16	Variety of ditto ditto, ...	Mukraih.	
17	Quartzose grit in No. 15, ...	Chederoo.	
18	Dolomitic Band in No. 15, ...		
19	Dolomitic Calcareous sandstone, (lower beds,)	Mount Tillah.	
20	Variety of ditto, (Upper beds,)..	Mount ditto.	
21	White variety of ditto, ...	Baghanwalla.	
22	Yellow variety of ditto, ...	Chumbul Range.	
23	Upper Red sandstone, ...	Pind Dadun Khan.	Contains Magnesia.
24	Purple shale above 23, ...	Arub.	Contains copper-ore concretions.
25	Quartzose grit with grains of Carb. of copper in beds in purple shales, ...	Mount Sikesur.	
26	Ditto with nodule of copper glame, ...	Dokree,	
27	Copper glame concretions from No. 24, ...	Kuttha.	
28	Ditto ditto ditto ditto, ...	Ditto.	
29	Ditto in siliceous sinter, ...	Koofree.	
30	Concretion of sulphate of barytes in purple shales associated with copper, ...	Kuttha.	
31	Chert from Salt Marl, ...	Dwoda.	
32	Siliceous sinter with Agate, Carboniferous Rocks, &c., ...	Chooah Salt Marl.	
33	Calcareous sandstone, ...	Kaffir kote.	Contains Productæ, &c.
34	Grey Limestone,.....	Ncorpoor.	Contains Encrinites, Terebratulæ, &c.
35	Black Limestone, ...	Moosahkhail.	Abounds in Orthis, Producti, &c.
36	Flesh-coloured Limestone,.....	Kaffir Kote.	Abounds in Encrinites and Palæozoic fossils.
37	Tubipore Limestone masses in No. 36, ...	Chederoo.	
38	Slaty Limestone, ...	Kaffir kote, &c.	Contain, Orthoceratites, Cratites, Icthyolites, &c.
39	Grey Schistose sandstone above 38, ...	Moosahkhail.	Is Magnesian, fossils scarce.
40	Dark Argillaceous sandstone, ..	Kaffir Kote.	
41	Yellow Calcareous bed in ditto,..	Ditto ditto.	Contains Encrinites.

List of specimens continued.

No.	Name.	Locality.	Remarks.
42	Rain-drop-marked sandstone above 39,.....	Moosahkhail.	
43	Magnesian sandstone above 42,..	Ditto.	
44	Fine-grained Magnesian sandstone, ...	Ditto.	
45	Upper Magnesian Limestone, ..	Ditto.	
46	Ditto ditto ditto, ...	Chichalee Range.	
47	Yellow lithographic Limestone below No. 44,.....	Moosahkhail.	Contains a few indistinct Icthyolites.
48	Bituminous sandstone above No. 40 resting on decomposing Bituminous shales,.....	Kaffir Kote.	Yields petroleum.
49	Encrinital Limestone, same as 46,	Nullee.	Contains Oothocératites, Producti, &c.
50	Brecciated productus Limestone, Oolitic Secondary Rocks, ...	Chichalee Range.	Contains Magnesia.
51	Yellow Argillaceous sandstone,..	Moosahkhail.	Contains impressions of ferns, &c.
52	Siliceous Quartzose grit, ...	Chichalee Range.	Contains pieces of carbonized fossil-wood.
53	Shell Limestone,.....	Mulokhail Chichalee Range.	
54	Clay Iron-stone from Shak alternating with beds of 52, ...	Mulokhail.	
55	Brown Calcareous grit; the grits having a metallic lustre, are probably the debris of Hypersthene Rock, ...	Chichalee Pass.	
56	Grey Cherty Limestone, ...	Mulokhail.	
57	Variety of ditto,.....	Chichalee Pass.	
58	Green Belemnite sandstone,....	Kalibag.	
59	Upper Quartzose grit, ...	Mulokhail.	
60	White lower quartzose grit, ...	Chichalee Pass.	Contains bits of carbonized wood converted into coke.
61	Fossil wood converted into Jet (Kalibag coal) from shales alternating with No. 52, ...	Kalibag.	Has been used as a fuel in the Indus Steamer.
62	Cherty Limestone from a mass resting on salt Marl, ...	Ditto.	Contains Magnesia in small quantity.
63	Ferruginous claystone (burnt bituminous shale).....	Moosahkhail.	In beds alternating with Nos. 51 & 52.
	Tertiary Eocene Rocks.		
64	Claystone (burnt shale) forms the base of the formation,....	Intana.	Sometimes highly ferruginous.
65	Quartzose grit in contact with 64, ...	Baghanwalla.	
66	Calcareous sandstone beneath alum shales, ...	Dundhote near Pind Dadun Khan.	Highly fossiliferous between Kuttha and Moosakhail.

List of Specimens continued.

No.	Name.	Locality.	Remarks.
67	Lignite alum shale, ...	Chichalee Pass.	Used in the manufacture of Alum.
68	Yellow Marly Limestone above shales,.....	Baghanwalla.	Contains nummulites, ostreæ, &c.
69	Nummulite Limestone above 68,	North side of Mount Tillah.	
70	Lower Nummulite Limestone, ..	Bukh Ravine Moosahkhail.	Fœtid when bruised.
71	Chalky lower N. Limestone,....	Kuttha.	
72	Lower Numl. Limestone with Fasciolites, ...	Koofree.	
73	Argillaceous Numl. Limestone,..	Mulokhail.	Fœtid when bruised, contains black flints.
74	Upper Nummulite Limestone, ..	Tober above Pind Dadun Khan.	Full of flints.
75	N. Limestone with nummulites,	Kalibag Hill.	
76	Black Flint from 73 and 74,....	Bukkh Ravine, Moosahkhail.	
77	Lignite (coal,)	Baghanwalla.	
78	Lignite (coal) from same seam about a mile distant from locality of 77, ...	Ditto.	Contains 1.840 Ash per cent.
79	Lignite, ...	N. side of Mount Drengun.	Much weathered, very brittle.
80	Ditto, ...	Pid near Pind Dadun Khan.	Ditto ditto ditto.
81	Ditto, ...	Dundhote 2 miles W. of last locality.	Ditto ditto ditto.
82	Ditto, ...	Nilawan ravine below Noorpoor.	Ditto ditto ditto.
83	Ditto (coal,)	Kurumee ravine near Kuttha.	
84	Ditto ditto,.....	Chichalee Pass.	Contains 30 per cent. of Ash.
85	Porous Gypsum associated with sulphur, ...	Jabba 10 miles E. of Kalibag.	Produced by the decomposition of Limestone.
86	Native sulphur in Limestone, passing into Gypsum, ...	Jabba ditto ditto.	
86a	Sulphur prepared by sublimation from Tertiary Miocene Rocks,	Ditto.	
87	Petroleum, ...	Ditto.	Floats on the surface of water.
88	Grey Calcareous sandstone, ...	Kullur Kuhar.	Yields gold dust, contains fossil bones, &c.
89	Grey hard Calcareous sandstone in beds alternating with No. 88, ...	Dhar Range near Dehrialah.	
90	Argillaceous Grit, ...	Ditto.	Used as a millstone, contains fossil bones, &c.

List of Specimens continued.

No.	Name.	Locality.	Remarks.
91	Jet (fossil wood) in masses in No. 88, ...	Nurwa near Kullur Kuhar.	
92	Black washed Iron sand with gold dust : the Debris of No. 88, ..	Bed of Boonah Nullah.	Ready for amalgamation process.
93	Red indurated clay alternating with 88, 89 and 90, ... Alluvial Rocks.	Kullur Kuhar.	
94	Calcareous Tufa, ...	Mount Diljubba.	Extensively burnt for lime.
95	Kunkur, ...	Jhelum.	Used extensively as a road metal.
	Lower Silurian or Cambrian Rocks,	Korana Hills Jetch Doab.	
96	Ferruginous quartzose sandstone,	Korana.	
97	Quartzite in beds in ditto,.....	Ditto.	
98	Siliceous clay slate in beds alternating with 96 and 97, ...	Ditto.	
99	Hæmatite in Quartz veins in No. 96, ...	Ditto.	Is a rich ore of Iron.
100	Peroxide of Manganese filling fissures in No. 96,.....	Ditto.	

Description of Sections.

TABLE No. I.

Index to Table of Colours and Markings used in Section of Salt Range.

O. Alluvium.

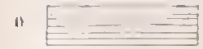
1. Tertiary Miocene Rocks.
   - *a.* Greenish sandstones, argillaceous grits, conglomerates and red and green clays.

2. Tertiary Eocene Rocks.
   - *b.* Nummulite limestone.
   - *c.* Brown calcareous sandstone.
   - *d.* Alum Shales with Lignite.

3. Secondary Oolitic Rocks.
   - *e.* Cherty thin-bedded limestones with shales.
   - *é.* Yellow, iron-stained quartzose sandstones, grits and bituminous shales.
   - *è.* Green belemnite sandstone and shales.

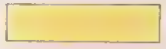
4. Primary Carboniferous Rocks.

Nº 1. TABLE OF COLOURS & MARKINGS USED ON SECTIONS OF SALT RANGE.


0 Alluvial


1 Tertiary Miocene

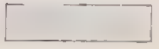

a


2 Tertiary Eocene


b


c


d


3 Secondary Oolitic

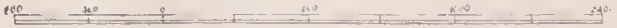

e e'


4 Primary Carboniferous


f


g


h


Scale of feet 800 = 1 inch


5 Primary Devonian

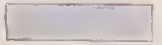

i


j j'


k


6 Devonian Salt Marl


l

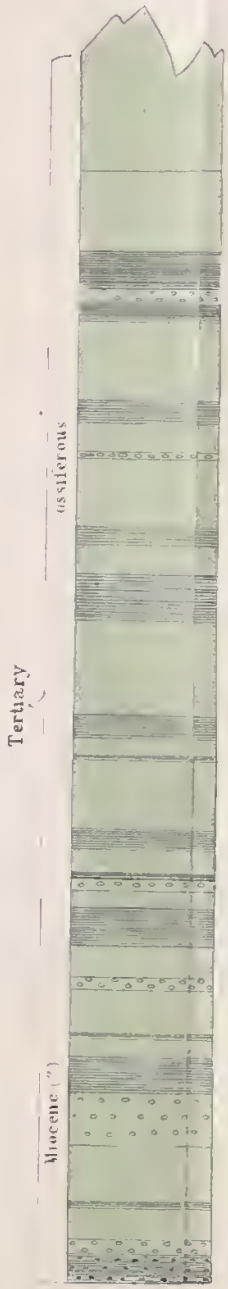

7

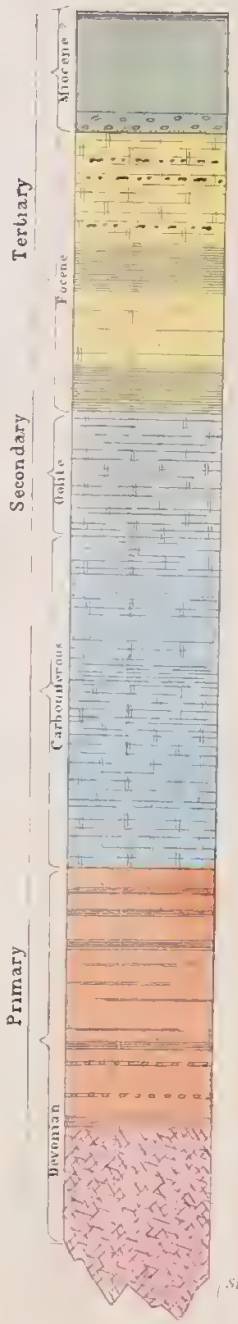
W^m Theobald jun^r
2nd Ass^t Geol^t

Signed A Fleming, M D
In Charge of Geological Survey
of Salt Range in the
Punjaub

Lith. Surv. Gen^l's Office Calcutta May 1863

N°2 SECTION SHEWING THE ESTIMATED VERTICAL THICKNESS OF SALT RANGE STRATA





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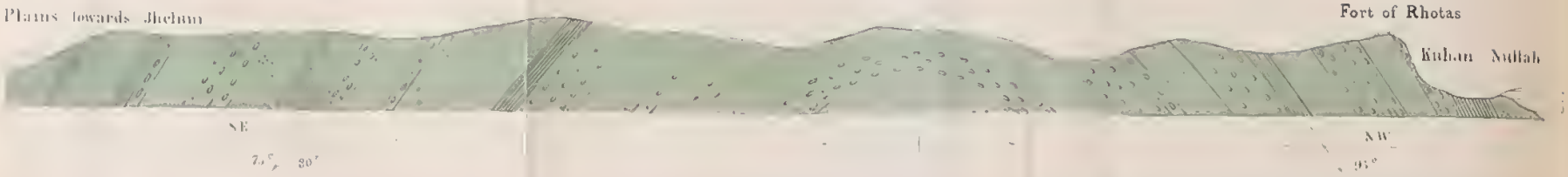
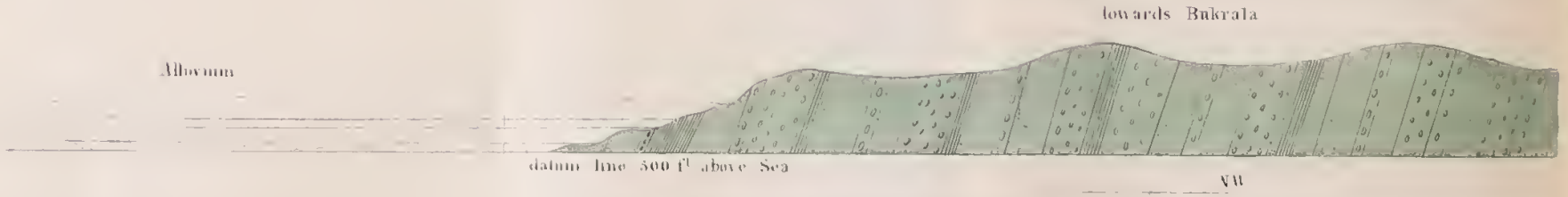
Punjaub.

Ind. Surv. Geol. Calcutta Vol. 18

N° 3 SECTION FROM MOUTH OF RHOTAS GORGE TOWARDS BUKRALA.





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f. Upper limestone, sometimes Magnesian.
g. Grey sandstone and shales.
h. Lower limestone, calcareous sandstones and shales.

5. Primary Devonian Rocks.
i. Upper red variegated sandstones, grits, conglomerates and clays.
j. Grey Dolomitic (Magnesian) sandstone.
j'. Greenish micaceous sandstones and shales.
k. Lower red sandstone and grit with conglomerates.

6. Devonian salt marl.
l. Red marl with gypsum and rock salt.

7. Lower Silurian or Cambrian Rocks.

In the Geological Maps, Nos. 5 and 6 have been represented by one colour.

N. B. Same scale has been used for heights and distances.

Table No. II.

Section showing the supposed vertical thickness of the various formations seen in the Salt Range, estimated at points where they attain a mean development.

Table No. III.

This Section represents the Tertiary Miocene formation as seen in the Rhotas gorge, between the plain near Jhelum and the village of Rhotas, and to the N. of this, towards Bukrala on the line of the Peshawur road.

On entering the gorge, through which the Kuhar stream flows towards the Jhelum, beds of soft grey sandstone, red clays and conglomerates are seen dipping under the plain in a S. E. direction, at an angle of from 75° to 80°. A succession of these beds follow, the angle of their dip gradually diminishing, until about a mile from the entrance of the gorge, where they present a beautiful anticlinal curve. Beyond this, their dip again increases, and at Rhotas is 75° to the N. W.

Crossing the bed of the Kuhar Nullah and proceeding along the Peshawur road, beds of alluvium are seen for about a mile. Beyond this, the sandstone strata again appear, dipping at an angle of 75° to the S. E., and may be traced almost uninterruptedly at Rawul Pindee,

presenting a succession of anticlinal and synclinal axes stretching from N. E. to S. W.

Table No. IV.

Section across the Rhotas range at Mount Tillah between the villages of Hoona and Bhet at right angles to the strike of the strata.

On ascending the hill from Hoon we have—

1. A succession of Tertiary miocene strata containing numerous mammalian bones, Saurian teeth, &c. Near Hoon they dip to the S. S. E. at an angle of 70°, but on ascending the hill, they present an anticlinal axis beyond which they dip to the N. N. W., as if under the escarpment of Tillah, an appearance which is evidently produced by a fault.

2. Salt Marl with Gypsum. This is very indistinctly seen at the base of the escarpment.

3. Red Sandstone with bands of Conglomerate.

4. Grey Dolomitic (Magnesian) Sandstone brecciated in some places.

5. Greenish micaceous Sandstones and Shales from the decomposition of pyrites, apparently in some of the beds of shale ; they have been converted into a red claystone.

6. Red Clays and Schistose micaceous sandstones.

7. Marly yellow nummulite limestone with Ostreæ ; in some places is a mass of these shells.

8. Tertiary miocene strata similar to No. 1.

Table No. V.

Section across the Salt Range near Baghanwallah.

In an ascending order we have—

1. An extensive alluvial deposit of boulders of gravel, sand and clay.

2. Salt marl. This does not appear on the surface, but from the abundance of saline efflorescence, evidently occurs beneath.

3. Red sandstone with bands of conglomerate ; its lower beds are schistose and argillaceous, contain laminæ of gypsum, and are encrusted with a saline efflorescence.

4. Greenish micaceous Sandstones and Shales.

5. Grey Dolomitic (Magnesian) Sandstone.

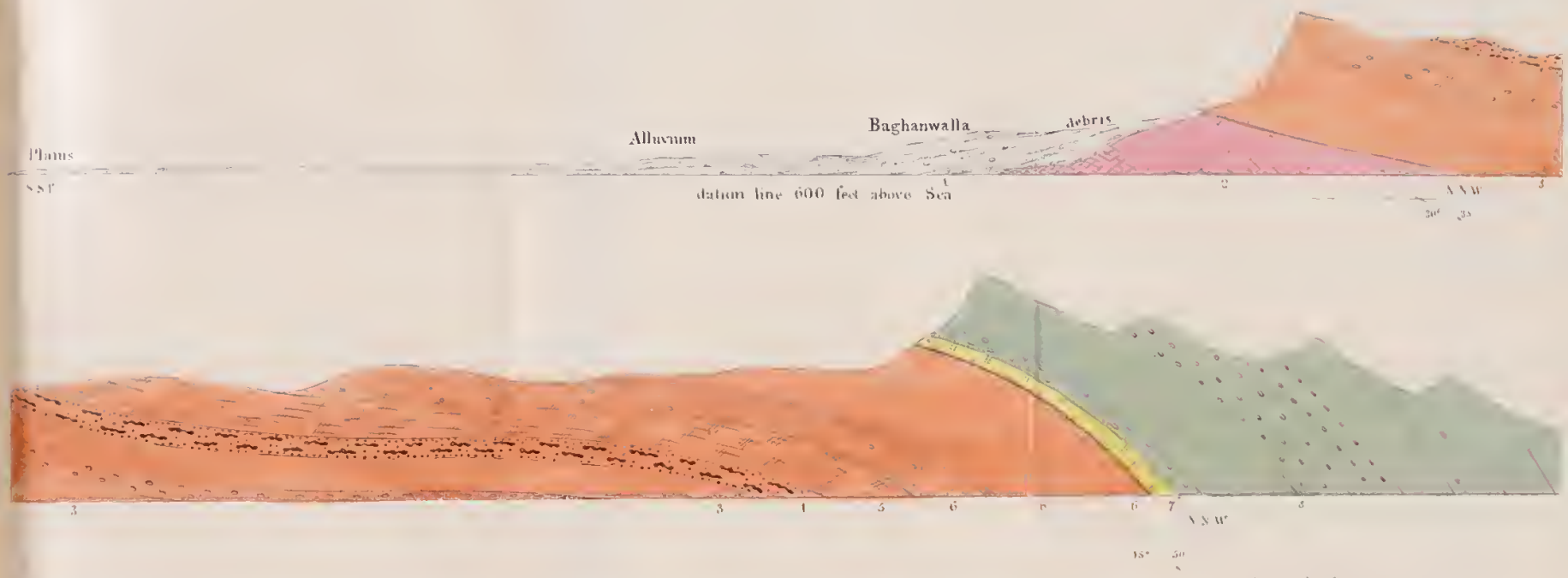
Nº 4 SECTION ACROSS MT TILLAH FROM HOON TO BHET

Line of Section from S S E to N N W

W. Theobald junr
2nd Asst del.

Surveyed A. Fleming M D
In Charge of Geological Survey
of the Salt Range in Punjaub

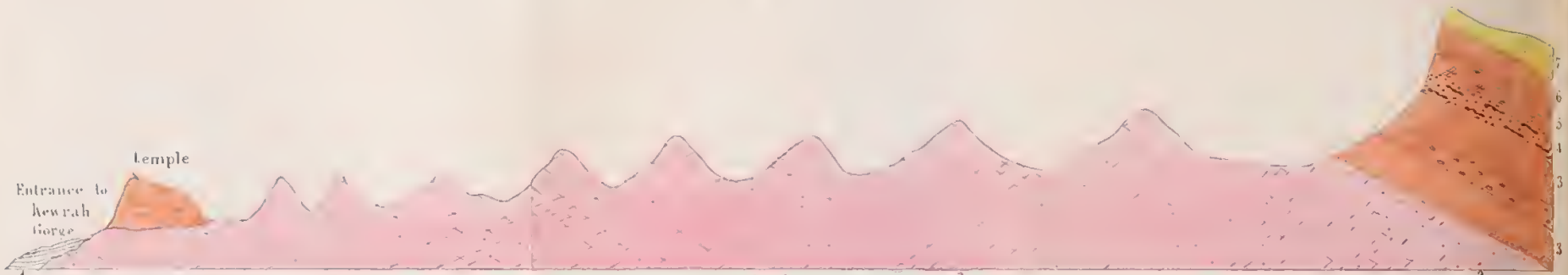
N° 5 SECTION ACROSS THE SALT RANGE NEAR BAGHANWALLA.

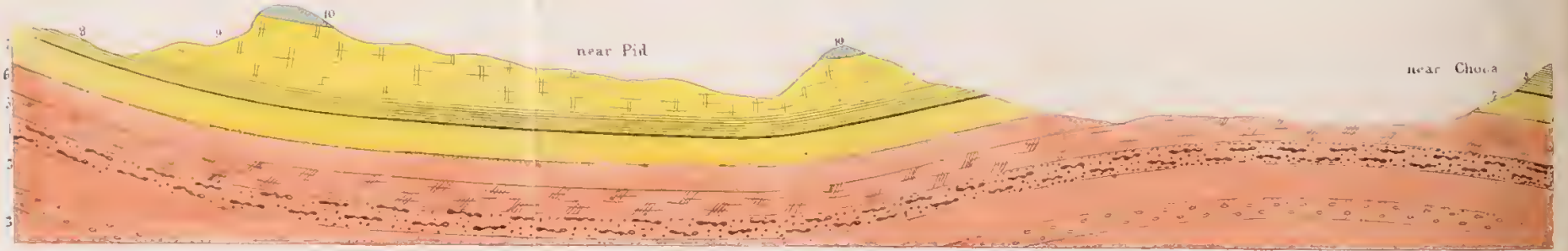


B Theobald jun.r
2nd Asst del

(Signed) J Fleming M D
In Charge of Colonial Survey
of Salt Range in the Punjaub

N°6 SECTION ACROSS SALT RANGE FROM KEWRAH TO CHOOA SEYDWN SHAH





Datum line 500 feet above Sea

40°

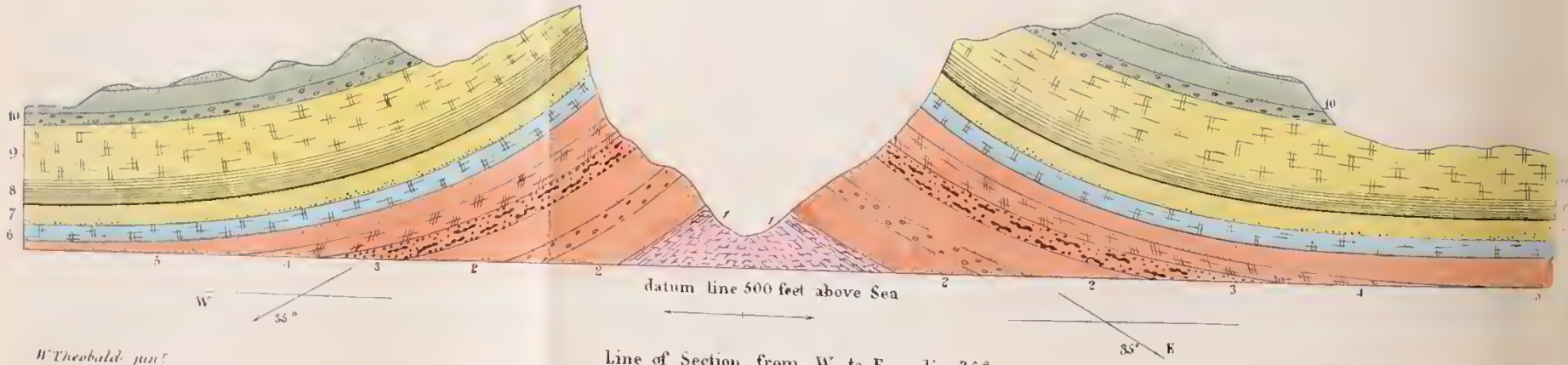
R. Theobald jun^r
2^nd Asst del^t

Signed) A Fleming M D.
In Charge of Geological Survey
of Salt Range in the Punjaub

Lith. surv. Gen^l's Office Calcutta May 1853

N°7 SECTION ACROSS NILAWAN RAVINE

IN SALT RANGE NEAR NOORPOOR.



W. Theobald jun.r
2nd Asst. delt

Line of Section from W. to E dip 35°

(Signd.) A. Fleming M.D.
In Charge of Geological Survey
of the Salt Range in Punjaub.

Lith. Surv. Gen.'s Office Calcutta May 185

6. Upper red variegated Sandstones, grits, conglomerates and red shales.

7. Yellow, marly nummulite Limestone, reposing on bituminous shales, indicated by the dark line in which a bed of lignite, from 3 to 5 feet thick, occurs.

8. Miocene tertiary Sandstones, argillaceous Grits, Conglomerates and red indurated Clays containing mammalian bones and teeth and lumps of brown silicified wood.

The above strata all dip to the N. N. W. at an angle of from 45° to 50°.

TABLE No. VI.

Section across the Salt Range from Kewrah towards Chooa Seydun Shah.

1. Alluvium.

2. Red marl with beds and masses of gypsum and salt, the strata of the former being often bent, and contorted in a most remarkable manner. The marl has been much disturbed, and presents few or no indications of its being a stratified deposit, except towards its upper surface, where it dips under the superior rocks.

3. Lower red sandstone with grit and conglomerates.

4. Greenish micaceous sandstones and shales.

5. Grey Dolomitic (Magnesian) Sandstone, weathering of a fawn colour.

6. Upper red variegated Sandstones, Grits, Conglomerates and clays.

7. Brown calcareous Sandstone (Eocene).

8. Eocene bituminous Alum Shales in which is a bed of inferior lignite.

9. Nummulite Limestone with irregular-shaped masses of grey flint.

10. Patches of miocene tertiary Sandstones, rapidly disintegrating; contain mammalian bones, &c.

TABLE No. VII.

Section across the Nilawan Ravine in the Salt Range below Noorpoor as seen about three miles from the plains.

1. Red Marl, presenting in its upper part thin alternating beds of red and purple clay, impure rock salt and gypsum; below it ex-

hibits the usual disturbed appearance, and contains large masses of salt and gypsum.

2. Lower red Sandstone, Grits and conglomerate bands.

3. Greenish micaceous Sandstones and Shales, with indistinct carbonaceous markings.

4. Grey Dolomitic (Magnesian) Sandstone, weathering of a dark brown colour.

5. Upper red Sandstone, Grits, purple and red Shales and Clays.

6. Primary carboniferous limestone, containing Encrinites, Producti, Spiriferæ and Teribratulæ.

7. Eocene brown calcareous Sandstone resting on a thin bed of ferruginous claystone.

8. Alum Shales with lignite seam, much decomposed in its outcrop.

9. Nummulite Limestone with Flint.

10. Tertiary miocene Sandstones, Grits, Conglomerates, &c. containing fossil bones and masses of silicified wood.

The above strata dip from either side of an anticlinal axis at an angle of 35°.

Table No. VIII.

Section across the Salt Range from the Zamanee Wan Ravine E. of Chederu to the neighbourhood of Dok. The distance is almost 7 miles and the general dip of the strata is to the N. E. at an angle varying from 45° to 55°.

In this Section the heights and distances are considerably falsified.

1. Salt Marl with Gypsum.

2. Lower red Sandstone, Grits and Conglomerates.

3. Greenish micaceous Sandstones and Shales with thin bands of hard Dolomitic Sandstone of a steel grey colour.

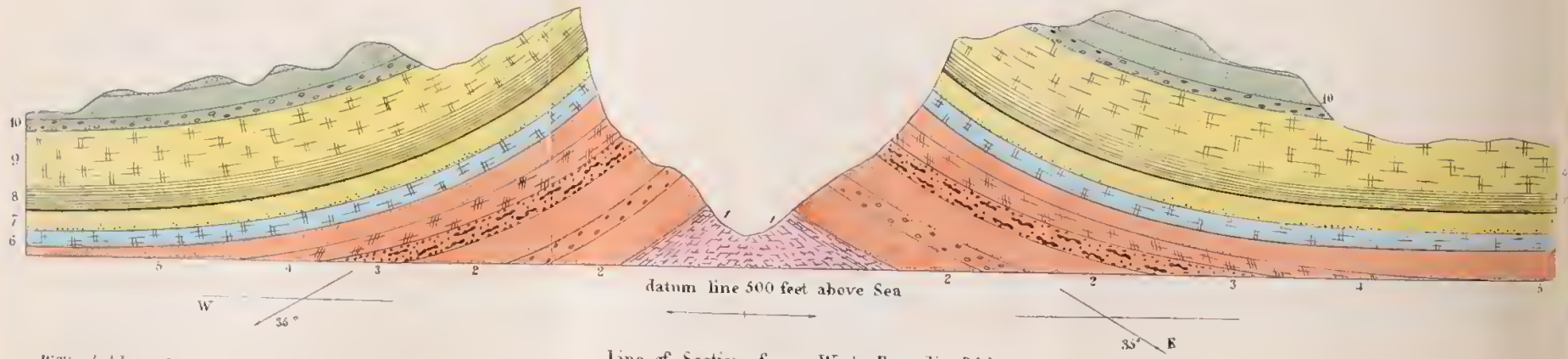
4. Dark red variegated schistose Sandstone, Grits and beds of Conglomerate, succeeded by Shales of a chocolate and purple colour, containing copper ore nodules.

5. Lower primary carboniferous Limestone and calcareous Sandstone, abounding in Encrinites, Producti, Spiriferæ, Orthoceratites, and Ceratites, &c.

6. Middle grey Sandstones and Shales.

Nº7 SECTION ACROSS NILAWAN RAVINE

IN SALT RANGE NEAR NOORPOOR.



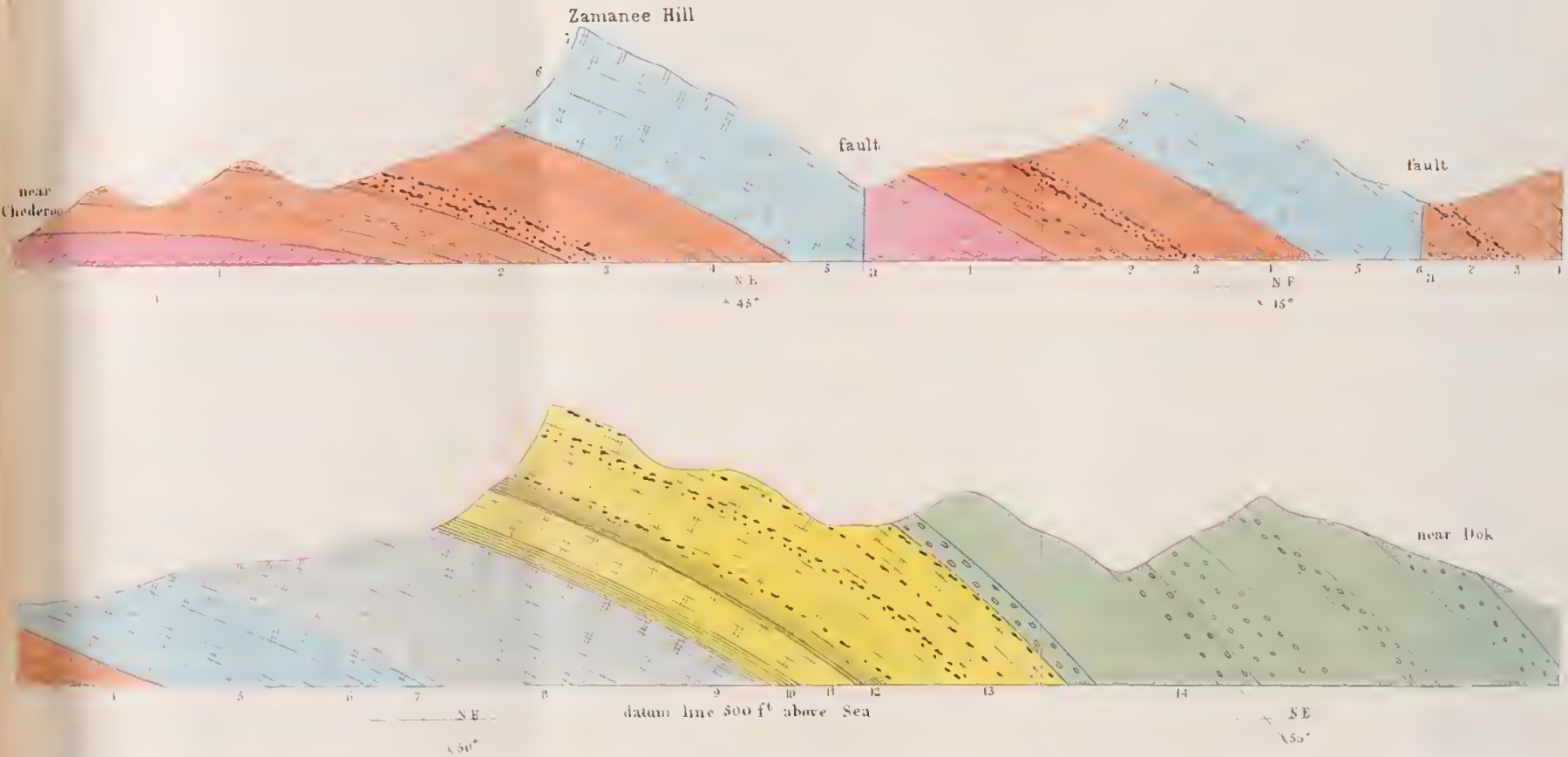
W Theobald jun^r
2^nd Asst del^t

Line of Section from W. to E dip 35°

(Signd) A Fleming M.D.
In Charge of Geological Survey
of the Salt Range in Punjaub.

Lith. Surveyors Office Calcutta May 51

N° 8 SECTION ACROSS THE SALT RANGE BETWEEN CHEDEROO AND DOK.



W Theobald junr
2nd Asst Survr

(Signed) A Fleming M D.
In Charge of Geological Survey
of the Salt Range in Punjaub

7. Upper primary carboniferous Limestone, full of Encrinites, Producti, &c.

N. B. In the Bukhh Ravine, 8 miles W. of line of section, this limestone is magnesian, and appears to contain no fossils.

8. Secondary, oolitic, yellow, iron-stained quartzose Sandstones, Grits and bituminous Shales, containing masses of carbonized wood.

9. Oolitic, cherty thin-bedded Limestones with a few shales.

10. Lower tertiary eocene Alum Shales resting on a coarse and highly fossiliferous limestone, containing Nummulites and large gasteropodous molluscœ.

11. Lower nummulite Limestone; its lower beds an imperfect conglomerate.

12. Upper Alum Shales and blue Marl.

13. Upper nummulite Limestone; lower beds argillaceous, upper compact nodules, and irregular-shaped masses of black flint abundant.

14. Tertiary Miocene Sandstones, Grits, Conglomerates and red Clays, containing mammalian bones, &c.

a. a. Are faults.

Table No. IX.

Section across the Chichalee Range on the W. bank of the Indus as seen on the W. side of the Chichalee Pass.

1. Primary carboniferous strata. These do not appear on the surface along the line of section, but occur in the position represented in ravines, both E. and W. of the Pass.

2. Oolitic, yellow, iron-stained quartzose Sandstones, Grits and bituminous Shales.

3. Oolitic cherty and shell limestones alternating with bituminous shales. The upper limestone beds contain Terebratulæ, Belemnites, fragments of Echinidæ, &c.

4. Black Shales passing into a green ferruginous sandstone. These beds contain Belemnites, Ammonites, Gryphеæ and Saurian teeth, bones, &c., associated with fragments of carbonized wood.

5. Iron-stained quartzose Sandstone, with fragments of jet.

6. Lower Eocene Alum Shales, containing irregular beds or nests of lignite.

7. Lower Nummulite Limestone, its lower beds are imperfect Conglomerates.

8. Upper Alum Shales.
9. Upper Nummulite Limestone with flints.
10. Tertiary Miocene strata with the usual fossils.

A. A. *(a.)* a fault occurs to the South, of which at the entrance of the Pass the beds, 3, 4, 5, 6, 7, 8, 9 and 10, are seen in reversed order. The nummulite limestone and oolitic strata are much shattered and compressed, the strata of the former being often remarkably contorted.

Table No. X.

Sketch of a slab of carboniferous limestone from Musahkhail in the Salt Range, containing Orthoceratites and Ceratites.

Catalogue of Reptiles inhabiting the Peninsula of India.—By T. C. Jerdon, *Esq. Madras Medical Service.*

CHELONIA.

Fam. TESTUDINIDÆ—or Land Tortoises.

Gen. TESTUDO.

Fore feet with 5 fingers, hind do. with 4 nails—Carapax of one piece—Sternum fixed in front.

Testudo actinodes, Bell.

Syn. *T. stellata*, Schw. and Gray—*T. geometrica*, Daud. and Shaw—*T. elegans*, Schœpf. and Shaw—*T. geometrica* apud Hutton, *J. A. S.* VI. 689, and plate XXXVIII.—*Kaynchwa*, H.—*Dasari*, Tambel, Teloog; vulgo *Adavi Moonigadoo*, or Jungle deaf-fellow—Indian Land Tortoise.

This Tortoise is tolerably common in the low jungles of the Carnatic, and I believe throughout the whole of the Peninsula. Length of the shell of one about 6 inches.*

* Capt. Thos. Hutton gives much larger dimensions *loc. cit. supra;* and we have a specimen which I picked up dead in a street of Calcutta, the length of carapax of which (in a straight line) exceeds 12 inches. Three living specimens which I received from Vizagapatam 5 or 6 years ago, certainly did not grow much in the interim, and the carapax of one of these recently dead, and added to the Society's museum, measures 8½ in. It also inhabits Ceylon; but not Lower Bengal.—E. B.

Nº 9 SECTION OF CHICHALEE HILLS W. BANK OF INDUS.

AS SEEN ON W SIDE OF CHICHALEE PASS

B Theobald junr
2nd Asst delt

Stoned A Fleming M D
In Charge of Geological Survey
of Salt Range in the Punjaub

Bukeram Nath & M Akram Scr

Lith Survey Gen's Office Calcutta May 1853.

Fam. ELODIDÆ—or Marsh Tortoises.

Gen. EMYS.*

EMYS TRIJUGA, Schw.

Syn. *E. Belangeri*, Lesson—*Goonta*, Tambel, Tel.

Carapax olive or brown, three-keeled, edges smooth.

By no means common in the south of India, and chiefly to be found in deep tanks and large wells.†

Length of shell of one 8 inches.

[Col. Sykes procured another EMYS in the Bombay Dukhun, E. TENTORIA, Gray, *P. Z. S.* 1834, p. 54, and the supposed adult E. TECTUM of Hardwicke's 'Illustrations.' The Society's museum contains an adult procured by Sir A. Burnes in Sindh, and we have also a young specimen from the river Hughly. The species is most nearly affined to E. TECTUM, Bell, and has the same peculiar form of the fifth vertebral plate; but the fourth is quadrilateral and elongate, the third has a broad transverse posterior margin, the keels of the vertebral plates (especially that of the fourth, so developed in E. TECTUM,) are much less prominent at all ages, the entire carapax is broader and flatter, and the abdominal plates are brown-black with pale margins, and occasionally one or two pale central spots,—instead of whitish, with two or three strongly contrasting blackish marks on each, as in E. TECTUM. Carapax of adult 7 in. long; that of adult E. TECTUM $6\frac{1}{4}$ in.

I am nearly certain that the small specimen is from the vicinity of Calcutta, and that I kept it alive for some time, but did not then distinguish it from E. TECTUM. Three species of restricted EMYS are extremely common in the neighbourhood of Calcutta, viz. E. TECTUM, E. HAMILTONII, Gray, (of which the carapax of our largest specimen measures $5\frac{1}{2}$ in. in a straight line,) and E. THURGII,

* For generic characters, vide Journ. As. Soc. 1847, p. 608. I think it superfluous to repeat in this Journal the characters so lately laid down in Dr. Cantor's most admirable Catalogue.

† Hab. also Central India (vicinity of Chaibasa); but in Ceylon it appears to be replaced by E. SEBÆ, Gray. According to M. M. Dumeril and Bibron, M. Dussumier procured a young individual in a lake near Calcutta (doubtless the salt-water lake); but we have never heard of another instance, although we have seen multitudes of *Emydes* from the salt-water lake and its vicinity.—*Cur. As. Soc.*

Gray, which attains to a much larger size than the others, though adults are not often obtained. Carapax of adult from 20 to 22 in., in a straight line. *Cur. As. Soc.*]

Fam. POTAMIDÆ—or River Tortoises.

Gen. CRYPTOPUS—Dum. and Bibr.

Carapax with a narrow cartilaginous border—sternum wide, flexible in front and behind, and able completely to conceal the extremities.

Cryptopus granosus—Dum. and Bibr.

Syn. *T. granosa* Shœpf.—*T. granulata*, Daud. and Sh.—*Trionyx coromandelicus*, Mesc., Geoff., Less.—*Emyda punctata*, Bell and Gray. —*Tambel* and *Goorada gadoo*, Tel. Shagreen fresh-water Tortoise.

This is an extremely common species in the south of India, and is found in tanks, rivers, wells, and pools of water, burying itself in the mud with great celerity. It is frequently brought to the Madras market and is eaten by many of the people there.

Length of shell of one, $8\frac{1}{2}$ inches—but it becomes much larger.*

Gen. GYMNOPUS—Vide Cantor, l. c. p. 614.

Gymnopus cartilagineus—Vide Cantor, l. c. p. 615.

I have observed this species in the Godavery, the Beena and other rivers of the north west of the peninsula, but have no specimen at present.

Gymnopus indicus, (Gray), Vide Cant. l. c. p. 616.

I have very lately procured a specimen of this large river Tortoise taken in a net at Mahé on the Malabar Coast, where, however, it is considered rare.

Length of carapax 30 inches.†

Fam. THALASSIDÆ—or Sea Turtles.

Gen. CHELONIA—Vide Cantor, l. c. p. 617.

Chelonia virgata—V. Cant. l. c.

I have procured this Turtle on the East Coast of India.‡

Chelonia maculosa—Cuvier.

* Extremely common in Lower Bengal, and here also much eaten by certain classes, as indeed are all other *Testudinata*. It likewise inhabits Ceylon.—*Cur. As. Soc.*

† We have succeeded in obtaining only one small specimen of this in the vicinity of Calcutta.—*Cur. As. Soc.*

‡ Very numerous on parts of the E. coast of the Bay of Bengal.—*Cur. As. Soc.*

Vertebral plates larger than broad, marked with yellow in an olive-brown ground.

This Turtle is occasionally caught by the fishermen both on the East and West Coasts of India.

Chelonia olivacea, Eschscholtz—Cant. l. c. p. 619.

Very common in the Bay of Bengal, where I have seen many captured by ship lascars swimming out during a calm. Length of carapax average about 2 feet.*

Chelonia imbricata (L.) V. Cantor, l. c. p. 619.

I have quite recently procured this Turtle at Tellicherry on the Malabar Coast.†

CROCODILIDÆ,—Bon.

Gen. Crocodilus—V. Cant. l. c. p. 621.

Crocodilus palustris, Lesson—V. Cant. l. c. p. 621.

This Crocodile, pronounced by some erpetologists only a variety of the Crocodile of the Nile, and so considered by Cantor, is very common in all the rivers and back-waters of Malabar and the West of India, very rarely seen out at sea. I have not seen it from the East Coast. It does not attain the dimensions of the next species, and is considered very harmless by the natives.

Crocodilus porosus—Schn. Cantor, l. c. p. 622.

This, the larger and fiercer of our two Crocodiles, is found in various localities both on the East and West coasts, and is the species so abundant in the fort ditch at Vellore. It is of very rapid growth. An egg brought from Vellore to Walter Elliot, Esq., was hatched in the Government house compound, and in eight years had increased to the length of 8 or 9 feet, becoming so powerful as to destroy a full grown buck Antelope which had come to drink water at the tank where it usually resorted to.

I may mention, here, that both of these species of Crocodile are almost universally called Alligators by the English in India; erroneously so, of course, as no Alligators have as yet been found in the old world.

* Abundant at the mouth of the Hughly.—*Cur. As. Soc.*

† In the Society's museum is a small specimen, procured in one of the Sunderbund rivers.—*Cur. As. Soc.*

Fam. CHAMÆLEONIDÆ.

Gen. CHAMÆLEO, Laurenti.

Feet thin with 5 fingers joined to the nails into two lobes, one of two, the other of three fingers. Skin granular. Eyes large, covered by the scales of the eyelid except one small round aperture. No visible tympanum.

CHAMÆLEO ZEYLONICUS—Laur.

Dorsal crest short; abdominal crest with the spines long and somewhat distant. Colour green.

Syn. *C. vulgaris*, var. B, Dum. and Bibr.—*C. zebra*, Bory de St. Vinc.—*C. calcaratus*, Merr.

I have no hesitation in considering this Chameleon distinct from the African one, as well on account of the slight but permanent structural distinctions (the abdominal ridge being in the African one composed of very short and closely set spines), as the difference of locality, and the great difference in the change of colour of the two. In our Indian one, the only change produced is from one shade of green to another. In a state of quiescence, it is usually very pale green, sometimes dark blackish green; but when excited it is mottled or *zebra'ed* very prettily with dark transverse blotches on a pale ground. I never saw any pure yellow, or red in any state.* It is found in all the wooded districts of India. It is used in medicine by some of the native doctors, and many generally be procured in the Madras market.

Length of one 10 inches, of which the tail is more than half.

CHAMÆLEO PUMILUS—Latreille.

Head tuberculated; dorsal crest continued over the tail. Some large circular scales mingled with the small and unequal granulose ones.

I possess a specimen of this small Chameleon in spirit, which was said to have been taken near Coonoor on the Nilgherries.

Length $5\frac{1}{2}$ inches, of which the tail is nearly 2.

Fam. GECKONIDÆ,—Bonaparte.

Gen. HEMIDACTYLUS, Cuvier, Cantor, l. c. p. 628.

HEMIDACTYLUS TRIEDRUS—Daud.

* A very fine one which we long kept, assumed a tolerably pure yellow ground-tint occasionally, with black markings.—*Cur. As. Soc.*

Many large triedral tubercles mixed with the other scales—tail somewhat rounded—several large transverse brown bands marked with large white triedral scales—7 or 8 femoral pores in each thigh in the males.

Syn. *Deowur bullee*, Tel., of the Yanadees.

This very handsomely marked Gecko is rarely found in houses, being chiefly met with in jungly places, on rocks and trees, in all parts of the country, but is nowhere common.

Length of one 7 inches, of which the tail is about half.

HEMIDACTYLUS SUBTRIEDRUS—n. sp.?

H. TRIEDRUS—var.?

Sookha bullee of the Yanadees.

Differs from TRIEDRUS in somewhat shorter head, in the scales of the throat and muzzle being smaller in its shorter head; fewer dark bars on the back and fewer of the white tubercles; and in the triedral scales generally being smaller. It is equal in size to TRIEDRUS, and the number of femoral pores is the same. Colours much as in TRIEDRUS but paler.

Length of one $6\frac{1}{2}$ in. of which the tail is more than half.

The Yanadees, a peculiar jungle race in the Nellore district, who have a considerable knowledge of reptiles, pronounced this to be a distinct species from the last, and gave it a peculiar name, or I should have put it down as a casual variety of TRIEDRUS without closer inspection. It is found chiefly in rocks, seldom entering houses. It forms a link between TRIEDRUS and MACULATUS.

HEMIDACTYLUS MACULATUS—Dum. and Bibr.*

Brown or olive-green with dark marks; back furnished with numerous subtriedral tubercles. This is the most common species of Gecko in the South of India, but never attains here the dimensions stated by Dumeril and Bibron. It is very subject to variation both in the ground-tint and the dark markings, which it appears to have the power of deepening or reducing. Length of an average specimen $4\frac{1}{2}$ inches, of which the tail is $2\frac{4}{10}$ths.

HEMIDACTYLUS PUNCTATUS—n. sp.

Back with some larger conical scales, and sub-caudal scutæ very large; scales of abdomen dotted, brown above; limbs and tail reddish

* Qu. H. FRÆNATUS, D. and B.? *Cur. As. Soc.*

with dark bands: a pale yellow streak from muzzle to tail bordered beneath by a dark line; another dark line from nostrils to behind the eye—beneath yellowish white—some of the sub-caudal scutæ orange.

Length $3\frac{2}{8}$ inches, of which the tail is $1\frac{1}{2}$.

I procured a single specimen of this small Gecko lately, in a house at Tellicherry. At first glance, I took it for *maculatus*. It appears very similar to *H. frenatus*, but I can find no pores, and the thumb appears as well developed as in *maculatus*.

HEMIDACTYLUS LESCHENAULTII—Dum. and Bibr.

Small tubercles scattered sparingly among the very small scales of the back, 13 femoral pores in each thigh. Adult pale grey above; young with dark markings and tail annulated black and white.

Length of one nearly 6 inches, of which the tail is $2\frac{6}{10}$ths.

This species of Gecko is very common throughout the South of India in houses. I have not observed the mode of coloration described by Dumeril and Bibron.

[Gen. HOMONOTA,—Gray.

H. FASCIATA, nobis. Body covered above with large, imbricated, keeled and pointed scales, below with much smaller hexagonal scales ranged in oblique series: the throat and limbs studded with minute hexagonal scales, larger on the thighs; and the head uniformly covered with hexagonal plates, smaller than the scales of the back. A range of simple labial plates above and below, the rostral larger, bordered on the lower jaw with a series of small oval plates, and these with a second series of smaller oval plates. Tail wanting in the specimen. The pupils appear to be round. Colour plumbeous-brown, with 7 or 8 irregular broad whitish cross-bands, formed each of three or more contiguous spots. An omega-like mark on the forehead. Length of head and body $1\frac{1}{2}$ in., of head $\frac{3}{8}$ in., This specimen was sent many years ago to the Society's museum by Mr. Jerdon. *Cur. As. Soc.*]

Genus GYMNODACTYLUS—Wiegman—Vide Cantor, l. c. p. 631.

GYMNODACTYLUS INDICUS,—(Gray).

Scales of body and tail small, equal; those beneath the tail larger.

Syn. *Goniodactylus indicus*, Gray.

This species, lately* described from specimens sent home by myself, is found on the Nilgherries, concealing itself under stones in the day time. I have procured it on the top of Dodabetta, the highest mountain of the group, and have also found it in Coorg. Its colours when fresh are a mottled brown, or greenish-brown, with a row of orange-yellowish spots along the back edged darker, and a line of similarly coloured spots on each side; lips also of the same tint, and the lower portion of the tail.

Length of one $2\frac{4}{10}$ inches, of which the tail is $1\frac{2}{10}$th.

GYMNODACTYLUS MALABARICUS—n. sp.

Scales of the back uniform, small, granulose, a few at the root of the tail between the two hind legs smaller, those in the tail above larger, imbricated; a few small spines at the root of the tail: dark brown above, marbled with black spots and a white spot on the nape.

Length of one $2\frac{4}{10}$ inches, of which the tail is about half.

I have only very recently procured this small Gecko from the forest of Malabar, where it frequents large trees and rocks. It is generally to be found on those large trees, whose base is protected by buttresses, in the inequalities of which it finds a secure retreat, and occasionally it hides itself under a cleft in the bark. The dark markings on its back are edged lighter, and it is of a bluish white colour beneath. It is of a more slender habit than the preceding species.

GYMNODACTYLUS LITTORALIS—n. sp.

Very slender form, scales of back small, equal; those on the muzzle larger; beneath the tail a series of large six-sided scales. Colour pale brown, with a series of paler marks along the back and tail, a black spot on the nape, the chin and throat pale yellow.

Length $2\frac{3}{10}$ inches, of which the tail 1 $\frac{2}{10}$th.

I procured a single specimen of this well marked species of Gecko in a ware-house on the Sea Coast in Malabar, and have not yet been fortunate enough to find another.

GYMNODACTYLUS MYSORIENSIS—n. s.

Scales of the back uniform, granulose, with 2 or 3 rows of spines on each side, and on the tail; tail beneath with a triple series of large unguiform scutæ.

* Ann. and Mag. of Nat. Hist., Dec. 1846, p. 429.

Head and back covered with small granulose scales, and two or three distant rows of spines on each side and extending along the tail; chin and throat covered with small hexagonal scales, gradually changing to rounded imbricated scales which cover the abdomen; scales of tail imbricate, with 3 rows of larger nail-shaped scutæ beneath; scales of the basal joints of the fingers and toes, enlarged, nail-shaped.

Body above greyish-brown, with a light stripe down the centre of the back, and a series of dark brown marks on the head, back and sides; legs and feet banded; beneath bluish-white; chin, throat, and anterior portion of palpebræ bright yellow.

Length of one $2\frac{1}{2}$ inches, of which the tail is $1\frac{1}{4}$.

I have quite recently found this small and very distinctly characterized species of Gecko at Bangalore, frequenting rocks and also entering out-houses. The young has the tail flesh-coloured: 2 femoral pores on one side and 3 on the other.

Fam. IGUANIDÆ.

Gen. CALOTES, Cuv. Vide Cant. l. c. p. 636.

CALOTES VERSICOLOR, (Daud.)

Two spines on each side of the nape. No fold on the neck.—Tail conical. Scales large, keeled.

Syn. *Agama Tiedmanni*, Kuhl.—*A. vulturosa*, Harl.

This is the most common and extensively distributed lizard in the country, being found everywhere in gardens, avenues and jungles. Though not a Chameleon in structure, it is yet one in habit, and much more so than our Chameleon. Its usual tints are a pale drab or fawn colour, but this it changes to bright red, to black and to a mixture of yellow red and black. This change is sometimes confined to the head, at other times diffused over the whole body and tail. A common state to see it in, is seated on a hedge or bush with the tail and limbs black, head and neck yellow picked out with red, and the rest of the body red. I am inclined to think that this display of colours is merely seasonal. It only occurs in the males, the females being uniformly and plainly coloured. The young has a pale band on each side of the body from the eye to the tail, and a series of dark bands on the back. Mr. Blyth mentions, in a notice of this lizard in the Journ. As. Soc. for 1842, p. 870, that its usual colour

is * * * * . This is somewhat remarkable and I should doubt if it was the same species. Are the changes mentioned here observed in Calcutta ?*

This and the other species of Calotes are essentially tree lizards, seeking their prey often on the ground, but always retreating up trees when in danger.

Length of one specimen 18 inches, of which the tail is 12.

CALOTES NEMORICOLA, nov. spec.

One detached spine in front of 2 or 3 small ones on each side of the nape. A fold of skin on the shoulder, scales of the sides very large, not keeled, those of the abdomen much smaller, keeled. Dorsal crest extending only about one-third along the back; colour green.

I only procured one specimen of this lizard near the foot of the Coonoor ghât of the Nilgherries. Compared with *versicolor*, the large smooth scales are the most prominent feature of distinction. The scales at the base of the tail above are of rather large size, keeled and pointed. The tympanum is large: where the dorsal crest terminates, the scales of the ridge are pointed.

Length of my specimen 18 inches, of which the tail is 8.

CALOTES ROUXI—Dum. and Bibr.

An oblique fold in front of each shoulder. Scales of the sides small, nearly as large as those of the abdomen. Base of the tail above furnished with much larger scales, somewhat angular. Colour pale brown with darker bands.

I have lately procured from the forests of Malabar a species of lizard, which appears to correspond with the description of *C. Rouxi* from the Burmese country. I found it more abundant than elsewhere in a small wooded island known as Pigeon I., about 20 miles

* I never saw any yellow in a Bengal specimen; and some which Dr. Kelaart sent me alive from Ceylon were perfectly identical with the Bengal reptile. It is chiefly during the months of May and June that the species here displays its fine colours; which generally are—head and neck, and more or less of the fore-part of the body, bright red; rest of body and limbs dark greenish-brown; and a great black patch on the shoulder. The female is smaller, and deposits her 8 to 16 eggs very commonly in a flower-pot, burrowing 4 or 5 in. into the hard dry soil, and finally covering them up most carefully, so that no appearance remains of the ground having been disturbed. The young appear in about 8 or 9 weeks. I have seen a two-thirds grown lizard of this species carry off and partly swallow a Scolopendra nearly of its own length.—*Cur. As. Soc.*

S. S. W. from Honore. The usual change of colour consists in the head and nape becoming brick red, and the rest of the body blackish.

Length of one 11 inches, of which the tail is $7\frac{3}{4}$.*

CALOTES VIRIDIS, Gray.

Nape with 2 isolated spines above the ears; a high crest on nape and shoulders diminishing along the back and lost on the root of the tail, scales large above, smaller beneath, those at base of the tail largest. I always considered that the very pretty green lizard which I had procured from Travancore and the southernmost portion of Malabar agreed tolerably exactly with the description of *C. ophiomachus*, but Mr. Gray has described it as new by the name of *viridis*.†

The colour is a bluish-green with 4 or 5 transverse stripes of reddish white, and some of the scales of the throat are edged with orange.

Length of one $16\frac{1}{2}$ inches, of which the tail is nearly 13.

CALOTES OPHIOMACHUS.

A small crest of long spines on each side of the nape. Dorsal crest extending to the root of the tail, which is long, conical, and very thin towards the end. Green; with transverse bands.

Mr. W. Elliot possesses a rough drawing and brief description of a green lizard, distinct from any of those previously described, which I believe to be identical with the *C. ophiomachus* of authors. He procured the specimen in Dharwar. Its dimensions were as follow:

Length 14 inches, of which the tail is 10.

The drawing represents the colours to be pale green with dark transverse bands, interrupted by a pale longitudinal line from ear to tail.

Gen. SALEA, Gray.

Differs from *Calotes* in the series of scales pointing directly back-

* This coloration is altogether dissimilar from that described of my supposed C. ROUXI from Newera Elia, vide *J. A. S.* XXI, 354.—*Cur. As. Soc.*

† Ann. Mag. Nat. Hist. XVIII, page 429. [There appears to be some confusion here. The present species we consider to be, decidedly, C. OPHIOMACHUS, as figured by Daudin; and its range extends to Ceylon and to the Nicobar islands. The C. VIRIDIS, Gray, was long ago presented by Mr. Jerdon to the Society, and it does not correspond with Mr. Jerdon's present descriptions, either of this or of the next species; yet his figure sent of the supposed OPHIOMACHUS would seem to represent C. VIRIDIS.—*Cur. As. Soc.*]

wards, or running in longitudinal lines; not as in *Calotes*, where the points are directed upwards, nor as in *Bronchocela*, where they are directed downwards.

SALEA JERDONI, Gray.

Nuchal and dorsal crest formed of elongated compressed scales; tail with a keeled crest.

This pretty lizard, described by Mr. Gray from specimens sent home by me, is only found in the Nilgherries where it frequents bushes, hedges and gardens. Its colour is a bright grass-green marbled with brown, some red marks on the head and nape, and a few white scales on the sides. It does not appear to possess the faculty of changing its colours.

Length of one 9½ inches, of which the tail is 6½.*

Gen. SITANA, Cuv.

Four toes on the hind-feet, no dorsal crest, a large dewlap in the males.

SITANA PONTICERIANA, Cuv.

Fawn-coloured, with rhomboidal dark spots on the back, and a pale longitudinal streak from ear to tail. Male, in breeding season, with a large tricoloured dewlap.

This common ground lizard is distributed over all India, I believe, but is rare in the wooded districts, frequenting the open country, fields and low copses: on the approach of danger, it runs with great rapidity, tail erect, and conceals itself in any crack in the ground or hole, or under a stone or bush. Notwithstanding its activity, it is the common prey of harriers, buzzards, hawks and eagles. I have not seen the beautiful dewlap (blue black and red) developed in the south of India, nearly to the extent that appears to take place in the north, and there it attains a greater size. The colours

* Hab. also Ceylon (Newera Elia), whence a specimen was presented by Dr. Kelaart to the Society's Museum, since purloined together with a SALEA from the Nicobars. Another, from Mirzapore (?), presented by the late Major Wroughton, may be described as.

S. GULARIS, nobis. Length 16½ in., of which the tail measures 11¾ in. Structure typical. Hind-limb reaching to the articulation of the lower jaw. Series of 14 lengthened spines from occiput to behind the shoulders, increasing in length to the 7th and 8th, and then successively diminishing. Gular fanon, or dewlap, well developed. Two inconspicuous ridges of slightly lengthened spines above the tympanum.—*Cur. As. Soc.*

of the dewlap are only exhibited during the pairing season, and it then becomes larger than previously. At this time, too, some blue marks are observable on the nape and back, that on the nape indeed forming a kind of crest more conspicuous now, the colours in general too are deepened, and the quadrangular marks on the back and barring of the limbs very distinct. The name *Sitana*, said by Cuvier to be the name by which it is known at Pondicherry, is a Latin termination of the word *Shaitan* or Devil, a name sometimes applied to it by the Musulmans of S. India.

Length of one $6\frac{3}{4}$ in., of which the tail is $4\frac{5}{8}$ in.

Gen. DRACO, *Linné*—Vide Cant. l. c. p.

Draco dussumierii—Dum. and Bibr.

Anterior and posterior angles of each orbit edged by a small pointed horn; grey, wings marked black and red.

This very beautiful little lizard is only found in the forests of the West Coast, or rather in the neighbourhood of the forests, for it frequents cocoa-nut and betel-nut plantations in their vicinity chiefly, not living, it is alleged, in the woods themselves, nor in the gardens at any distance from the forest. It is tolerably common in all Malabar, Cochin and Travancore, but not known farther North than Malabar, being either unknown or very rare in Canara.

The colour of the body is a delicate grey with some darker markings, which the animal occasionally renders very distinct, at other times obscures entirely. It sometimes also changes its whole hue to a dark blackish grey. The ground colour of the wings is red marbled with black and edged with yellow. The small dewlap is pale yellow marbled with green at the base. This I may remark is never extended forwards to the extent usually seen in stuffed specimens, being merely brought forward now and then to the edge of the chin, and in a flat state not distended with air. The two lateral appendages of the head, also, are merely slightly raised now and then, and never distended in the manner seen in dried specimens.

Gen. AGAMA—Daudin.

Head short, triangular; nostrils near the muzzle: 2—5 incisive teeth in upper jaw; a longitudinal fold beneath the throat and another across the neck. Tail compressed, conic. Anal pores.

AGAMA DORSALIS—Gray.

Nostrils small, somewhat tubular; occipital plate very small, simple; a small group of spines behind the ear, which is large. Dorsal crest almost wanting; scales above small, equal, keeled, those beneath smooth.

This large rock lizard is only partially distributed in Southern India, and is only found at some elevation above the sea. It is most abundant in Mysore, and especially so in the neighbourhood of Bangalore, where it may be seen on every bare rock about. It is also not uncommon on the edges of the Nilgherries up to the height of nearly 6000 feet. Its normal colour and that of the female at all times is a dusky grey with dark markings. The male can assume a very bright livery, viz. fine vermilion red above, with a streak through the eyes; under surface, limbs and tail black: occasionally the red is exchanged for yellow. It frequents bare rocks only, and retreats into holes and clefts on the approach of danger.

Length of a fine male 16 inches, of which the tail is $10\frac{1}{2}$.*

Fam. VARANIDÆ.

Gen. VARANUS—Vide Cantor l. c. p. 633.

VARANUS DRACÆNA—L. (*Query Linné?*)

Tupin. bengalensis, Daud.—*V. guttatus*, Merr.—*V. argus*, Merr. —*Tup. cepedianus*, Daud. and Kuhl.—*V. punctatus*, Merr. and Less. —*Mon. gemmatus*, Guer. Ic. R. A.—*V. Bibroni*, Blyth, *J. A. S.* 1842, p. 869.

Nostril situate exactly between the eye and muzzle. Tail compressed with a strongly dentated ridge.

This species of Monitor appears generally spread throughout the whole of India. It is chiefly nocturnal in its habits and frequents jungly places. It is by no means confined to the neighbourhood of water, though perhaps it prefers such a locality. It defends itself most vigorously by striking with its tail. It can climb well both trees and walls, and it is popularly believed, that thieves make use of it to effect an entrance into a building or over a wall by allowing the guana to get hold by its fore-claws of the window sill or wall and pulling themselves up by it. It is eaten by the natives, who

* The Society possesses a specimen from Pind Dadun Khan, presented by W. Theobald, Esq., Junr.—*Cur. As. Soc.*

consider it highly nourishing and aphrodisiac, and many Europeans use it for soup, imagining it allied to the West Indian Guana. It can always be procured in the Madras market.

Length of one 44 inches, of which the tail is 25.*

Fam. LACERTIDÆ.

Gen. CALOSAURA—Dum. and Bibr.

Maxillary teeth simple and tricuspid. Nostril placed on the *canthus rostralis*. A small fold of skin in front of the shoulder; abdominal scutæ quadrilateral, smooth, placed in longitudinal bands; 5 fingers and 5 toes; tail square at the root, round for the rest of its extent.

Calosaura Leschenaultii—Dum. and Bibr.

Dorsal scales rhomboidal, keeled; six rows of longitudinal scales on the abdomen.

Reddish brown above, pale yellow beneath, sides dark brown with 2 pale yellow bands, tail red.

Length of one $5\frac{2}{10}$th in. of which the tail is $3\frac{1}{2}$.

This pretty little ground lizard is somewhat locally distributed. I have seen it in the Salem and Coimbátoor districts only, especially near the banks of the Cavery. It frequents bushy ground, hedges of Euphorbia and clumps of Cactus, under which it rapidly takes shelter, as also among rocks.†

Gen. ACANTHODACTYLUS—Fitz.

One naso-rostral plate, ventral lamellæ quadrilateral, smooth. Fingers and toes compressed, toothed.

Acanthodactylus nilgherrensis—n. s.

Anterior edge of ear toothed scaly, collar transverse, scales of back somewhat larger behind than in front, an occipital plate.

This lizard, apparently belonging to a genus new to India, was

* The largest specimen in the Society's museum measures 52 in.; and our largest of *Hydrosaurus salvator*, (Laur.), 78 in., or exactly the same as that of *H. giganteus*, Gray, in the British Museum. *Empagusia flavescens*, Gray, our third common Monitor of Lower Bengal, we have not known to exceed 3 ft. in length. The Society has lately received a large specimen of *Hydrosaurus salvator* from Ceylon; and *Empagusia flavescens* likewise inhabits the Indus territories. —*Cur. As. Soc.*

† The Society's Museum contains examples of what we take to be this species from Pind Dadun Khan, in the Punjab Salt Range; and formerly possessed the same from Afghanistan.—*Cur. As. Soc.*

obtained by W. Elliot, Esq. on the Nilgherries near Coonoor. I have not myself been fortunate enough to observe it, and know nothing of its haunts. Its colours in spirit are of a pale pearl grey with a row of black spots on its back, another row on its sides somewhat larger and white, edged black.

Length of one $5\frac{1}{2}$ inches, of which the tail is 3.*

Fam. SCINCIDÆ.

Gen. MOCOA—Gray.

Mocoa bilineata—Gray, Ann. Nat. Hist., Dec. 1846, p. 430.

Fronti-parietal plates two, separate; ears round, moderate, with two very indistinct minute scales in front; the drum sunken; scales 6 or 8 rowed, thin, smooth; above shining olive, whitish beneath, a dark broad line on each side from nostril to end of tail; two narrow dark lines on back from neck to end of tail. In the young and half grown animal, the tail is of a beautiful smalt or violet colour.

Length of one $5\frac{1}{2}$ inches, of which the tail is $3\frac{1}{2}$.†

I have only found this Scink under stones on the summit of the Nilgherries. It appears very similar to *Lygosoma Dussumerii of* Dumeril and Bibron.

Gen. RIOPA—Gray.

Riopa albopunctata—Gray, l. c.

Pale olive brown above, yellowish white beneath, sides of neck and body, purplish black, dotted with white. Length of one 4 inches, of which the tail is not quite 2.

This certainly looks very like the *Tiliqua pulchra* figured in Gray and Hardwicke's Illust. of Indian Zoology. I have found it in the Nellore district, where it is rare.‡

Riopa punctata (L.)—Gray.

Length of one 9 inches, of which the tail is $4\frac{3}{4}$.

I have found this lizard both on the Eastern and Western Coasts of India under stones, or in the ground.

* A specimen with tail imperfect was long ago presented by Mr. Jerdon to the Society's museum.—*Cur. As. Soc.*

† Remarkable for its *Riopa*-like proportions, and great length of tail; also for having four large acutely triangular præ-anal scales, with the points converging posteriorly.—*Cur. As. Soc.*

‡ The Society has lately received it from Mergui.—*Cur. As. Soc.*

Riopa Hardwickii—Gray.

Very similar to the last, but with a longer and more pointed muzzle, and brighter colours, the stripes on the back being generally more distinct, and the tail, in the young, bright vermilion red. I have only found it in the Carnatic, where it is not very rare.

Length of one 9 inches, of which the tail is 5. It is found concealed in dark places, under logs of wood, stones, &c.*

Gen. TILIQUA.

Tiliqua rufescens—Merr.

T. carinata, Gray—*Euprepes Sebæ*—D. and B.

This is the most common Scink in the country, being universally dispersed throughout India, hiding itself under leaves, rubbish, stones, in dark rooms, &c. It runs with some rapidity, and is very active. Those I have seen in the Carnatic have the two yellow bands on the sides well developed, and appear to belong to the varieties A. and B. of Dumeril and Bibron, whilst on the Malabar Coast the variety D. and E. only is to be seen.†

Length of one 9 inches, of which the tail is $5\frac{1}{4}$.

Tiliqua trivittata—Gray.

Gray and Hardwicke's Ill. Ind. Zool.

Very similar to the last, but with the head shorter and more triangular, scales of the back broader, and three stripes along the back.

Length of one 8 inches, of which the tail is $4\frac{3}{4}$.

Mr. Gray, in his description of the *Euprepes trilineata*, mentions that his *T. trivittata* is yet unknown in Europe. I possess two specimens, which correspond exactly with the figure in Hardwicke's 'Illustrations.' I procured my specimens at Jalnat, where it is the common species.

Tiliqua rubriventris—Gray.

Gray and Hardw. Ill. Ind. Zool.

Olive brown above, beneath yellowish, usually red on the throat only, at times the whole abdomen red, sides white-spotted on a dark

* Hab. also Ceylon.—*Cur. As. Soc.*

† Those of Bengal are constantly banded, so far as we have seen; and the sanguine red colour of the lower band seems to denote the breeding season. In a very large specimen taken lately in my own garden (length 12 in., of which the tail measures $7\frac{1}{2}$ in.), the bands are nearly obsolete.—*Cur. As. Soc.*

grounnd, row of black spots on centre of back, and some other smaller ones on each side: three keeled scales.

Length of one $6\frac{3}{4}$ inches, of which the tail is $3\frac{6}{10}$ths.

This pretty Scink is tolerably common in wooded places, lurking about chiefly among fallen leaves. It is more abundant on the West Coast than in the Carnatic. The red colour of the abdomen is, I think, seasonal, and confined to the males. Mr. Gray mentions that, before my specimens were sent home, it was only known by the figure in Hardwicke.*

Gen. EUPREPES.

EUPREPES TRILINEATA—Gray, l. c.

Ears with two elongated scales in front, scales five-keeled, above pale yellow brown, beneath yellowish white, 3 white stripes edged with black on anterior half of the back, legs reddish.

Length of one $7\frac{2}{10}$ inches, of which the tail is nearly 4.

This well marked species is locally distributed. I have found it only in sandy ground, near the sea in the Carnatic, concealing itself in holes and fissures, and under shrubs.

I procured, on one occasion, a specimen of a small Scink in the forests of Malabar, which appeared distinct from any of the previous ones. It was uniform dark above and whitish beneath, body compressed, and scales two-keeled. Unfortunately, however, it was destroyed before I made a full description of it. I may here mention that *Goniodactylus indicus*, *Calotes viridis*, *Salea Jerdoni*, *Mocoa bilineata*, *Riopa albopunctata*, and *Euprepes trilineata*, were described by Mr. Gray from specimens sent home by me to the British Museum.

* The Society has a small specimen from Asám which may be T. MULTICARINATA, (Kuhl?), apud Gray. Scales distinctly seven-keeled. Colour greyish olive-green above, with dark spots on the hinder part of the body and base of tail. Lateral band, commencing from the ears, dark olive, with three narrow whitish stripes along the basal half of the tail, which are broken into spots on the sides of the body. Terminal half of tail whitish. Below also white, with obscure dark striæ.

Note on the Discharge of Water, by the Irrawaddy.—By J. McCLELLAND, *Esq. F. L. S., Commissioner of Forests, Rangoon.*

At the request of Capt. Phayre, Commissioner of Pegu, aided by Lieut. Nicholson of the 4th Seiks and the boats of the Hon'ble Company's Steam Frigate Sesostris, I took the soundings and velocity of the current, at different points, across the bed of the Irrawaddy at Prome, on the 14th and 25th of April last, with a view of ascertaining the quantity of water discharged by the river into the sea.

From a river-guage kept on board the Sesostris anchored opposite the wharf at Prome, (extracts of which are annexed,) it appears that there was a fall of about twenty feet from October 1852, when the place was taken, to February.

How much the river had fallen prior to October when the guage was first noted, is uncertain, as also the daily ratio of the fall during the subsequent months of November, December and January, the entries in the Sesostris's log-book having at first been irregularly made.

The river, however, continued to fall until the 23rd of February; on the 26th and the three subsequent days, a rise, in all of eleven inches, took place.

This partial rise of eleven inches in February, was followed by a fall of fourteen inches in March, with a slight rise of $\frac{3}{4}$ of an inch on the 24th, and again of two inches on the 29th of March.

From this date until the 7th of April, the river again fell about an inch daily, when it rose again five feet seven inches from the 8th to the 13th of April.

These changes in the river appeared to take place without reference to the changes of the weather, or even of the season in Burmah. On the contrary, the rains or S. W. monsoon, may be said to have set in at Prome on the 16th of May, when some inches of rain fell, and probably still earlier in the Arrakan and Moneepore mountains, from which direction the Irrawaddy receives a considerable tributary, yet the river continued still to fall, so that on the 5th of June, it stood one foot lower than it stood on the 14th of April.

About the beginning of April or end of March, 1837, the late Mr. Griffith observed that at Mogoung, one hundred and eighty miles above Ava, the Irrawaddy presents the same large undivided body of water as in the lower parts of Burmah, and, as an instance of its great magnitude, he says that it is not affected in size or appearance by the addition it then receives of the Mogoung river, the last large tributary worthy of the name, which the Irrawaddy receives.

These circumstances together with the quantity of water discharged by the Irrawaddy into the sea, certainly claim for it a first place amongst the great rivers of the east, hardly second to the Ganges itself.

While thus struck with the size of the Irrawaddy, we are forcibly reminded of its being, I believe, the only one of our great rivers, whose source is still a matter of speculation.

Making all allowance for the extravagance of Burmese Historians, there is enough in the authenticated history of the country, to show that great armies have passed and re-passed to, and from, China. Besides which, the Chinese character of the boats and houses of Burmah, together with some of the ceremonies of the people, suggest a more immediate and direct intercourse with China on the part of the Burmese, than any other nation on the western side of the Himalaya. So much so, that I have often heard it surmised by our officers at Prome, as one way of accounting for the resemblances, that the Irrawaddy probably flows from China, not that it was supposed to be navigable to that extent, but that its valleys may afford comparatively easy passes between the two countries.

Klaproth considered the Irrawaddy to be a continuation of the *Tsan peu* or great river of Thibet, an opinion with which Mr. Griffith coincided. Colonel Wilcox, however, an excellent authority, considered the Tsan peu to be the continuation of the Burrampootur, and Captain Pemberton, I believe was of the same opinion, and accordingly made the Irrawaddy terminate in the Borkhumtee country, three hundred and sixty miles above Ava, although there can hardly be a doubt that it must necessarily have a more extended course, more especially as it has been traced two hundred miles

above Ava, without observing any perceptible difference or diminution of size.

Under these circumstances, discoveries of much interest may be expected to result from an investigation of the source of the Irrawaddy.

It is true that a part of the Chinese province of Yunnan approaches to within four days journey of Mogoung, and presents an extended boundary along the north-eastern frontier of Burmah sufficient to account for the direct intercourse that appears to be carried on between the two nations. But Yunnan itself seems to be here a mountain province, with perhaps but little communication with the rest of the Empire.

If on the other hand, the Irrawaddy be found, as is not unlikely, to be the continuation of one or other of the two great rivers laid down on Pemberton's Map as coming from the north of Thibet, some great gate or pass may be found across the chain by means of which an easy communication is formed with the central provinces of China.

The mean depth of the river on the 25th of April was ascertained to be 12.70833.

The mean speed of current was found to be $1\frac{2}{2}\frac{1}{1}$ of a mile or 3440 yards per hour.

The mean speed multiplied by 0.8 will give the average speed of the whole volume. The direct breadth of the River opposite the Commissariat Ghaut, taken by means of the Theodolite, was found to be 1210 yards.

Average speed in feet.	Mean depth.	Breadth in feet.
8256	× 12.70833 ×	3630 =

380,859,500.1024 cubic feet discharged per hour.

$\frac{380,859,500.1024}{60.}$ = 6,347,658.33504 cubic feet discharged per minute.

$\frac{6347658.33504.}{60.}$ = 105794.305584 cubic feet discharged per second.

There are 6.2321 gallons in a cubic foot.

Rise and Fall of the Irrawaddy at Prome between the 20th of February and 30th of March, 1853.

Date.	Rise.		Fall.		Remarks.
Feb. 20th,	..	..	1	Inch.	
21st,	0	0	0	0	
22nd,	..	..	1	Inch.	
23rd,	..	..	1	Inch.	
24th,	0	0	0	0	
25th,	..	..	1	Inch.	
26th,	4	Inches.	..	..	
27th,	2	Inches.	..	..	
28th,	3	Inches.	..	..	
March 1st,	2	Inches.	..	..	
2nd,	..	..	1	Inch.	
3rd,	..	..	1	Inch.	
4th,	..	..	1	Inch.	
5th,	..	..	1	Inch.	
6th,	..	..	1	Inch.	
7th,	0	0	0	0	
8th,	..	..	3	Inches.	
9th,	0	0	0	0	
10th,	0	0	0	0	
11th,	0	0	0	0	
12th,	0	0	0	0	
13th,	..	..	1	Inch.	
14th,	..	..	1	Inch.	
15th,	..	..	1	Inch.	
16th,	0	0	0	0	
17th,	..	..	1	Inch.	
18th,	..	..	$\frac{3}{4}$	Inch.	
19th,	..	..	1	Inch.	
20th,	..	..	$\frac{1}{4}$	Inch.	
21st,	..	..	$\frac{1}{4}$	Inch.	
22nd,	..	..	$\frac{1}{2}$	Inch.	
23rd,	..	..	$\frac{1}{4}$	Inch.	
24th,	$\frac{3}{4}$	Inch.	..	..	
25th,	..	..	$\frac{3}{4}$	Inch.	
26th,	0	0	0	0	
27th,	0	0	0	0	
28th,	0	0	0	0	
29th,	2	Inches	..	..	
30th,	..	..	1	Inch.	
31st,	..	..	..	..	

Rise and Fall of the Irrawaddy at Prome between the 8th and 24th of April, 1853.

Date.	Rise.	Fall.	Remarks.
April 8th,	1½ Inches.	.. ..	
9th,	2½ do.	.. ..	
10th,	22 do.	.. ..	
11th,	27 do.	.. ..	
12th,	13½ do.	.. ..	
13th,	1 do.	.. ..	
14th,	.. ..	4 Inches.	
15th,	.. ..	8 do.	
16th,	.. ..	4 do.	
18th,	.. ..	11 do.	
20th,	.. ..	10 do.	
21st,	.. ..	3 do.	
22nd,	.. ..	5 do.	
23rd,	.. ..	2 do.	
24th,	.. ..	2½ do.	

No. 964.

Memorandum on the prospect of remuneration in working the Iron Mines of the Raneegunge district. By Major W. E. Baker, *Consulting Engineer to the Govt. of India, with a Report on the same subject by Professor Oldham, Geol. Surveyor.—Communicated by the Govt. of Bengal.*

The prospect of profit in working these mines, has been fully and ably discussed by Professor Oldham in his report, dated 18th May, 1852, pp. 9 to 20, and though I cannot say that his arguments have on all points commanded my conviction, I believe that on the whole they are sound; at all events I have not the familiar knowledge of details, which would enable me to combat them, or would justify my dissent from his general conclusion, p. 18.

"That under existing conditions the manufacture of Iron, on any efficient scale, and on the European system, cannot be undertaken in this district with a certain prospect of such a return, as would justify the great outlay required."

But Mr. Oldham remarks in the paragraph succeeding that which I have quoted, that the then "existing conditions" may alter, and, in fact, they have already altered to such an extent, as materially to affect the argument.

One of the most important calculations on which Mr. Oldham's conclusions rest, is that of the relative cost in England and India, of the raw materials required for the manufacture of a ton of pig Iron—showing a difference in favour of India, of 11*s.* which he does not consider to afford a sufficient margin to cover the increased cost of machinery required for the subsequent processes—or the risks so forcibly and truly enumerated in the 13th page.

About half of the estimated cost in India is that of limestone, which is set down at 8*s.* 6*d.* a ton in Calcutta, and 27*s.* a ton at Raneegunge—but the mineral branch of the Railway is now approaching completion, and though stopped for the present at the Collieries, would doubtless be extended to the site of any large Iron works that might be established—this would convey limestone from Calcutta at about 7*s.* 6*d.* a ton, making an aggregate cost of 16*s.* instead of 27*s.*, and exactly doubling the difference of cost in favour of India.

But a circumstance which will still further affect the comparison, and which will throw additional weight into the scale of the Indian manufacture, is the great rise which has lately occurred in the price of Iron at home, and of freight of all kinds from England to this country. How far the continuance of these prices may be depended upon, it is impossible to say—but it should be recollected that Mr. Oldham's comparison was made during a period of great depression of the Iron trade, when prices were lower than, I believe, they had ever been before, or were likely to be, or at all events to continue, again.

On these considerations, I would hope that the prospect of turning to useful account, the mineral riches of this locality, are not now so discouraging as they appeared to Professor Oldham, but I would recommend those, who may contemplate embarking their capital in such a speculation, to commence on a small scale, by the establishment of one or two blast furnaces for the manufacture of cast Iron (for which there is a considerable local demand), and to await public opinion on its quality, before incurring the additional expense of puddling furnaces, rolling mills, &c.

In connexion with this subject, I may mention that the chairs supplied for the East India Railway by the Porto Novo Iron Com-

pany of Madras—have been much objected to, by the Engineers, as being brittle, and somewhat irregular in shape. I would not say that these faults (if not exaggerated) are irremediable—or that they would necessarily be found in the Raneegunge manufacture—but they serve to illustrate the truth that something besides the raw material is requisite to the production of a marketable article—and perhaps also, we may further deduce from these circumstances, that Iron of local manufacture will have to encounter a certain amount of prejudice on the part of English Engineers and Platelayers.

G. A. C. Plowden, Esq., *Offg. Secy. to the Govt. of India.*

(Sd) W. E. Baker, *Major,*
Consulting Engineer to the Govt. of India.
20*th June*, 1853.

(True Copy)

(Sd.) G. Couper, *Offg. Under-Secy. to the Govt. of India.*

No. 189.

From the Superintendent of the Geological Survey,
To W. Gordon Young, *Esq., Under-Secy. to Govt. of Bengal.*
Dated August 10*th*, 1853.

Sir,—I have the honor to acknowledge the receipt of your letter No. 513, dated July 19th, 1853, enclosing copy of a memorandum by the consulting Engineer to the Government of India in the Railway Department, on the prospects of remuneration in working the Iron mines of the Raneegunge district, and requesting that I will report my opinion on the subject, under the present altered aspect of the case.

Major Baker has very justly stated that a great change in the conditions under which the manufacture of Iron in that district could be undertaken, will be effected by the completion of the intended Railroad to Raneegunge; and by the consequent economy of transit for such materials, as are required in that manufacture, but which, not occurring in the vicinity, must be procured from a distance. And while admitting the justice of the conclusion at which I had arrived from an investigation of the whole matter in 1852, he yet considers that the alteration in the conditions then existing, will be of sufficient amount materially to affect the argument.

The principal, and indeed the only change in these conditions of any importance, to which Major Baker refers, is the greatly diminished cost of limestone, the price of which would be reduced from 27*s.* per ton, (at which I estimated it,) to about 16*s.* per ton. Of course the sum estimated by Major Baker, as the cost of carriage per Railway is liable to such alteration, as experience in the cost of working the line may introduce, but taking this estimated cost as correct, we would have a saving in the cost of limestone of from 10*s.* to 11*s.* per ton. But this does not, as Major Baker says, "exactly double the difference of cost of the raw materials in favour of India," as the difference originally estimated by me, of 11*s.* per ton, was *per ton of pig Iron*, and not per ton of limestone. Taking then the cost of limestone at 17*s.* instead of 27*s.* per ton, we would have the entire cost of the raw materials required for the production of one ton of pig Iron as follows.

	s.	*d.*
Coal, ...	7	$2\frac{1}{2}$
Ore,.....	14	$4\frac{3}{4}$
Limestone, ...	12	9
	34	$4\frac{1}{4}$

As compared with 52*s.* $10\frac{1}{2}$*d.* in Great Britain or a saving in prime cost of 18*s.* $6\frac{1}{4}$*d.* per ton.

I should state here, that subsequently to the publication of my former report, I was informed by more persons than one, that I had therein estimated the cost of raising the Iron stone at too low a price, and that in reality the expenses attending it, would be more nearly 6*s.* per ton, than 4*s.* My own enquiries did not lead me to think so, but I should not wish to place my casual examinations in comparison with the long acquired experience of those resident in the neighbourhood, and who could not have any very obvious interest in misrepresenting the facts, as the establishment of Iron works would evidently benefit the district. But if these statements be admitted as true, and the estimate given above be modified accordingly, the cost of the raw materials for one ton of pig Iron would be

	s.	*d.*
Coal, ...	7	$2\frac{1}{2}$
Ore,.....	21	$7\frac{1}{2}$
Limestone, ...	12	9
	41	$6\frac{1}{2}$

This as compared with the cost in Great Britain, (52*s.* $10\frac{1}{2}$*d.*) will leave the difference in favour of India, very nearly the same as originally estimated, viz. 11*s.* notwithstanding the difference in cost of the limestone.

As I have stated above, my own enquiries certainly did not lead me to think that the cost of raising the ore, would be more than 4*s.* per ton. But on a reference to my report, it will be seen that I fully anticipated and referred to the difficulties which would attend on the extraction of it, and stated that I had been fully satisfied that Mr. Williams had previously under-estimated its cost. It is possible, I did so also, judging from the amount of work which would readily be done by an English miner. But I do not think the cost (even allowing for all these difficulties, and for the want of training in the hands employed) could be so great, as it has been stated. If the cost be therefore estimated at the mean of the two statements, or at 5*s.* per ton. we have the cost of raw materials still showing a balance in favour of India of 14*s.* 11*d.* or 15*s.* per ton.

Now I have, in my former report, estimated that the difference in the cost of the raw materials of 11*s.* per ton of pig Iron would not more than counterbalance the great additional charges and risks, necessarily attendant on such undertakings in this country. Beyond this, there will remain therefore a clear saving, under the altered conditions of the case, of from 4*s.* to 7*s.* for each ton of pig Iron.

Major Baker also states, as additional reasons for supposing that the manufacture of Iron could probably be carried on with profit now, that since my report was written the price of Iron has greatly advanced, and also the charge for freight.

With reference to the former fact, that the price of Iron has advanced, it must be borne in mind that the calculations in my report were founded on the cost of the raw materials without any reference whatever to the cost of the manufactured article. And I may state,

that I purposely avoided any allusion to the then cost of Iron, as I was fully aware, that at the time alluded to, Iron was being sold at the smallest possible profit, and in many cases *at an actual loss.*

With regard to the question of *freight*, I have no means of ascertaining the probability of a continuance or non-continuance of the present high rates, though I am disposed to think, that these rates are *exceptional*, caused by the sudden diversion from the ordinary channels of trade, of a very large amount of shipping, in consequence of the rapid and immense extension of intercourse with the gold-producing countries. I have no means here, of ascertaining by a reference to commercial reports, what the average charge for freight has been, during the last twenty years, but I am inclined to think that the tendency has been to a regular decrease, and not to an increase, and to suppose that the present is only a temporary derangement in the scale of charges, arising from the temporary causes, which are even already passing away. On this, however, I cannot pretend to offer an opinion, and of course, any increase in the freightage charges will be so much in favour of the Indian manufacture.

If therefore, my former conclusions were just (and I was glad to find that Major Baker fully confirmed the general correctness of the argument) I am still of opinion that the only really well founded advantage in favour of the manufacture in India, will be the saving in the original cost of the materials and that this saving will be from 4*s.* to 7*s.* per ton of pig Iron manufactured; this saving being over and above the amount sufficient to counterbalance all additional risks in this country. And *I think that this ought to be sufficient to induce the investment of capital in such undertakings.*

Major Baker has suggested that any persons engaging in such manufacture, should at first confine their attention to the production of cast Iron only, in the justice of which advice I fully concur. Indeed, such *must* be the necessary consequence of any attempt to work these ores, on an efficient scale. I do not, however, see that there is any sufficient demand for cast Iron, to justify the commencement of such heavy works as would be required *with a view to the production of cast Iron only.* Major Baker states that there is "a considerable local demand for cast Iron." A reference to the tables

of imports however, shews that during the year 1851, only 510 tons of pig-iron were imported. Now a single blast-furnace of small size would produce about 45 tons per week, or considerably more than 2000 tons per annum, that is more than four times the amount at present required to supply the market. And such blast-furnaces to be worked economically, must be worked nearly continuously.

With such a demand, therefore, (and I am not aware of any supply of cast Iron other than that imported) or even supposing this demand to be doubled, I cannot see that any one would be justified in undertaking such a manufacture on the British system, with a view to the supply of cast Iron only :* I would put out of the question the consideration of other systems, as being inapplicable to the peculiar kind and quality of ores found in the district referred to.

Major Baker in his memorandum refers to the objections urged against some of the chairs supplied by the Porto Novo Madras Iron Company. I have myself seen castings turned out from that Company's works, which on any English Railroad, would have been not only objected to, but at once rejected without the slightest hesitation. But I am satisfied that these defects arose as much from a want of sufficient care in moulding, and from the use, probably, of inferior sand, as from the quality of the metal; and that they are quite capable of being remedied. I stated in my former report (page 15) that the character of the iron produced in this country should, like every new article of commerce, be established before it would be purchased with confidence, and there can be no doubt, it would have to contend against the *thoroughly well grounded prestigè* in favour of English work, but this difficulty would rapidly vanish, provided the articles supplied, were equally good in quality and finish.

In connexion with this subject, I cannot avoid again taking the

* Supposing there were a demand for 1000 tons of pig Iron; and that as above calculated, the manufacturer in India would have an *additional* profit, beyond the ordinary profits of the trade, of 7*s*. per ton (taking the most favourable estimate) this would only give him £350 per annum; while the first outlay for machinery, &c. would be at the least £6000 to £7000, thus yielding an additional profit of nearly five per cent. Having no returns of the amount of "castings" imported, I have been obliged to estimate solely from the amonnt of pig Iron imported.

opportunity of respectfully urging on the consideration of the Most Noble the Governor of Bengal the great importance of a careful and systematic analysis of the several Iron ores of the district referred to, and of other parts of India. I have already,* in connexion with coal enquiries, urged the importance of such a series of experimental investigations, and I am satisfied that valuable results would spring from a similar enquiry into the composition, &c. of the various ores of India; of the methods now adopted in their reduction, and of the possible improvement in these. There have been no trustworthy analyses of these ores as yet made, and it is possible that some ingredient may be found in one or other of the many beds, which may either render the ore of that bed comparatively useless, or may materially increase its apparent value. Such a series of analyses systematically conducted by a competent chemist, and in connexion with the actual examination of the mode of occurrence of the several ores in the field, would prove of great value; but could only be undertaken with advantage by some one, who could devote his time zealously, and continuously to the task, so that the result might be strictly comparable.

(Signed) THOMAS OLDHAM,

Darjeeling, August 1st, 1853. *Superintendent of Geological Survey.*

Literary Intelligence.

Extract from a letter of Colonel Rawlinson, C. B. Honorary Member of the Asiatic Society of Bengal, to Dr. A. Sprenger.

Baghdad, April 15th, 1853.

"I have indeed such an enormous mass of materials in hand that a couple of years' leisure, is almost indispensable to put them in order, and carry them through the press. The historical portion consists of an almost continuous series of annals extending from the time of Solomon to the destruction of Nineveh. But besides this, I have the library of the Assyrian kings to classify and publish.

* From Superintendent of Geological Survey, To Under-Secretary Government of Bengal. No. 181, June 27, 1853.

—On the clay tablets, indeed, which we have found at Nineveh, and which are now to be counted by thousands, there are explanatory treatises on almost every subject under the sun, the art of writing, grammars, and dictionaries, notation, weights and measures, divisions of time, chronology, astronomy, geography, history, mythology, geology, botany, &c. In fact we have now at our disposal a perfect cyclopædia of Assyrian science, and shall probably be able to trace all Greek knowledge to this source."

Extract of a Letter from Col. Rawlison to Mr. Grote, dated, *Baghdad, 5th July*, 1853.

"You will have seen probably in the Anniversary Report of the London Society, a brief account of my late proceedings, but I may be able to add a few details of interest that have not yet been published. The comparative modernicity of the Assyrian Empire is now established beyond all cavil. I have obtained almost a complete list of Kings numbering about thirty from the fall of Neneveh, late in the 7th century B. C. to the institution of the Empire in the middle of the 13th century. Previously to that date Assyria was subject to Babylonia, and as materials accumulate, we should be able, I think, to turn up Babylonian history, through the various dynasties noted by Berosus to the real starting point of Western-Asiatic Empire, in the 23rd century before the Christian era. I do not expect to ascend higher than that period, except through ethnic affinities and mythological tradition, sources of evidence which should be used very cautiously, but which, in this case, I can already plainly see will bring the subject into immediate connection with the 10th chapter of Genesis. The labour, however, required to bring out these results is immense. It would take a person at least ten years nearly, to copy all the curious MSS. documents now at our disposal, forming the debris of the Royal Library at Nineveh; and in the mean time wherever we dig, fresh tablets are being brought to light, so that our stores of information are likely to increase indefinitely. With regard to the mechanism of this enquiry, I must also inform you that if you merely looked to my preliminary dissertation in the R. A. S. Journal, you would have a very imperfect idea of the extent or condition of the Alphabet. Later researches have furnished me with above a thousand distinct characters, and

these characters have on an average four or five distinct values, so that the very element of the study presents a really formidable difficulty. I will write to you at greater length, as soon as I have a little more time at my disposal."

Extract from a letter from Sir Henry Elliot to Dr. A. Sprenger, dated Cape Town, June 23rd, 1853.

"I am engaged just now in printing off a few copies of some of the notes and appendices I have been writing, since the beginning of the year. Much is left incomplete, as I have not the means of finishing the notes here, since references are required to works which I have not got. This refers to the Arab period (see Journal As. Soc. Vol. XX. p. 252). The previous printing of the most difficult portion, will save a deal of trouble, when I put the whole work to press."

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR JULY, 1853.

The Society met on the 6th instant at the usual hour.

Sir JAMES COLVILE, Kt. President, in the chair—

The minutes of the last month's proceedings were read and confirmed.

The accounts and vouchers for the month of April and May were laid on the table.

The following presentations were announced:

1. From J. A. Cockburn, Esq. Supt. Barrackpore Park. Specimens of a Loris (Nycticebus tardigradus), a Pheasant (Phasianus torquatus), and a Porcupine (Hystrix bengalensis).

2. From the Secretary of the Meteorological Society of Mauritius. Proceedings of the Society for May, 1853.

3. From J. L. Beaufort, Esq. Pubnah. A silver coin of the reign of the Emperor Akbar, dated 999 A. H.

4. From Major Baker, on the part of G. Turnbull, Esq. Chief Engineer of the E. I. Railway. Specimens of fossil bones found in the Ranigunge district.

The following is an extract from Major B.'s letter.

"I beg to forward, for presentation to the Asiatic Society, on the part of G. Turnbull, Esq. Chief Engineer of the E. I. Railway, some fossil remains consisting of a set of tarsal bones, and three fragments of the jaw, of a large ruminant.

"I am informed that these specimens were found in the Ránigunge district, near the confluence of the Damuda and Singharin,

in an excavation made for the purpose of obtaining ballast for the Railway: it will be observed that they are encrusted with limestone (Kankur).

"They were accompanied by several other fossils which I have failed to obtain, but which are said to have been of a similar character to these now presented to the Society. It is probable that they all belonged to one animal."

Mr. W. J. Herschel of the Civil Service, duly proposed and seconded at the last meeting, was balloted for, and elected an ordinary member.

Dr. E. Röer was named for ballot at the next meeting,—proposed by Mr. Grote and seconded by Dr. Sprenger.

The Council submitted a report for the removal of Mr. J. T. Shave's name from the list of members, under Rule 13.

Communications were received—

1. From W. Muir, Esq. Secretary to the Government of the North-Western Provinces, forwarding a Meteorological Register kept at the Government Secretariat Office, Agra, for the month of April.

2. From W. G. Young, Esq. Under-Secretary to the Government of Bengal, enclosing further correspondence regarding the discovery of coal on the bank of the Chawa Nadee.

The report of the Curator of the Museum of Economic Geology, read at the April meeting, referred to this discovery. The correspondence now received gives the result of an examination of the site of the coal by a small party of sappers.

The following extract from the report of the serjeant in charge of the party is not favourable.

"The Sivok Nadee is about four miles long, and takes its rise from between two high hills (names not known) which are, judging from supposition, in height three or four thousand feet, and very steep, extending its course for upwards of two miles between these hills, before it opens out into the *plains*. Ultimately it empties itself into the river "Teesta" two miles further on, the average width being about ninety feet, and it is in that portion of the Nadee between the hills *and not on the plains*, that, amongst the high rocks which overhang each side, the coal exhibits itself in the fissures of

the rocks, in small quantities, which with difficulty we extracted. The thickness of veins visible in the fissures in the rocks, is from a quarter to two inches, that in the cavities we found in lumps, specimens of which I am bringing with me. The whole of the coal to be seen is embedded in a hard sandstone."

3. From Major J. Turton, Prome, offering for the Society's acceptance, specimen of a fossil root of a tree from that district.

The following is an extract from Major T.'s letter:

"It was broken in half whilst being rolled towards the camp and when first moved, a piece eight or ten inches in length, that might be called the tap-root, was broken off and afterwards lost. The root measured about four feet across the longest diameter, and two to two and a half at the shortest. It was found embedded on one of the small hills to north-east of the Pagoda a mile or so distant, and to all appearance was on the position in which it had grown. Only one piece of any size such as would be considered part of the same tree was lying near it."

4. From Dr. J. Fayrer, Rangoon, enclosing Meteorological Registers kept at the Field Hospital, Rangoon, for the months of February, March and April.

5. From C. Gubbins, Esq. Bijnore, noticing the occurrence of a dust-storm at Bijnore on the morning of the 30th May last.

The following is an extract from Mr. Gubbin's letter:

"For the benefit of future meteorologists, I may as well place on record the fact of an *andhi* or dust-storm coming from the north-east, the first time that I remember such an occurrence during nearly twenty-five years' residence in the northern parts of the upper provinces. Its extent appears to have been considerable, including all northern Rohilcund, but I am not aware how far it was felt south of Moradabad, nor whether it entered the Doab.

"The month of May has here been very tolerably mild, but on Sunday the 29th the atmosphere became oppressively warm. The evening and night were extremely close, without the usual freshness towards morning, and as the sun rose (30″) an east wind also got up raising clouds of dust, but hardly sufficient to be called a dust-storm. Throughout the whole day a grove of trees, about a mile off, was never once seen, some other trees within three hundred yards

were dimly perceived as in a cloud, and although there was constant sunshine, it was so reflected and obstructed by the fine dust floating in the atmosphere, that often for an hour together, there was hardly a perceptible shadow cast.

"Towards 6 P. M. the wind, still from the north of east, rapidly increased, and for about quarter of an hour blew as strongly as in an ordinary *andhi* (I have no Anemometer, so cannot be more precise), completely hiding from view an out-building rather above a hundred yards distant. The whole then cleared off, a very few drops of rain fell, and the evening and night were clear and remarkably cool for the season. This was probably due to a heavy fall of rain which, I am informed, took place about the same time among the lower hills."

6. From Captain C. Haughton, enclosing a note on the site of Alexandria ad Caucasum.

The Librarian submitted a list of additions made to the Library during the past month.

Read and confirmed, 3rd August, 1853.

(Signed) J. W. Colvile.

Library.

The following additions have been made to the Library since the last meeting.

Presented.

A Geological Report on the Kymore Mountains, the Ramghur Coal Fields and on the manufacture of Iron. By D. H. Williams, Esq. Calcutta, 1852, 8vo. 2 copies.—By the Government of Bengal.

Journal of the Indian Archipelago for Jan. 1853, 2 copies.—By the same.

A notice of the Origin, Progress and Present Condition of the Academy of Natural Sciences of Philadelphia.—By W. S. W. Ruschunburger, Philadelphia, 1852, 8vo.—By the Academy.

The Benares Magazine, Vol. VIII. p. ii.—By the Editor.

The Calcutta Christian Observer for July, 1853.—By the Editors.

The Oriental Baptist, No. 79.—By the Editor.

The Upadeshak, No. 79.—By the Editor.

The Oriental Christian Spectator for May, 1853.—By the Editor.

The Missionary for July, 1853.—By the Editor.

Bibidhártha Saṅgraha, No. 18.—By the Editor.

The Citizen Newspaper for May and June.—By the Editor.
Purnachandrodaya for June, 1853.—By the Editor.
The Indian Charter, for June.—By the Editor.
Tattwabodhiní Patriká, No. 119.—By the Tattwabodhiní Sabhá.

Exchanged.

The Calcutta Review, No. 38.
Edinburgh Philosophical Journal, No. 108.
The Philosophical Magazine, Nos. 31, 32.

Purchased.

The Annals and Magazines of Natural History, Nos. 64, 65.
Journal des Savants, January to March, 1853.
Comptes Rendus, Nos. 8 @ 13.

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for August, 1853.

The Society met on the 3d instant at the usual hour.

Sir James Colvile, Kt. President, in the Chair.

The minutes of the last month's proceedings were read and confirmed.

The accounts and vouchers for the month of June last were laid on the table.

Donations were received—

1. From R. N. C. Hamilton, Esq. Resident at Indore, 2 copies of a Memorandum on the caves of Kulvie in Malwa, by Dr. E Impey, Presidency Surgeon, Indore.

2. From Captain M. Turnbull. A squirrel from the Straits *(Sciurus hypoleucos*, Horsf.)

3. From H. Stainforth, Esq. C. S. through Captain Thuillier, twelve silver coins dug up from the ruins of Gour.

4. From W. G. Young, Esq. Under-Secretary to the Government of Bengal, a map of the station and suburbs of Jessore for the use of the Museum of Economic Geology.

Dr. E. Röer, duly proposed and seconded at the last meeting, was balloted for, and elected an ordinary member.

The following gentlemen were named for ballot at the next meeting.

Captain J. C. Haughton, 54 N. I.;—proposed by Captain Hannyngton and seconded by Dr. A. Sprenger.

George Plowden, Esq. C. S.;—proposed by J. R. Colvin, Esq. and seconded by Mr. A. Grote.

Lieut. C. H. Dickens, Bengal Artillery;—proposed by Mr. Grote and seconded by the President.

The President in a short speech announced to the meeting the death of Major Kittoe, and then proposed the following resolution which was seconded by Mr. C. Allen and carried unanimously:—

Resolved—that the Society desires to record its regret at the death of Major Kittoe, for many years a valuable member of this Society, and a distinguished labourer in the field of Indian Archæology.

A conversation then took place on the subject of Major Kittoe's papers and drawings, in the course of which Dr. Ballantyne stated that Major K. had left certain facsimiles of inscriptions in the College at Benares. It was consequently resolved that the Secretary should address the Government with a view to measures being taken for the preservation of those or any other documents relating to archæology which may have been left by Major Kittoe in India; and should at the same time state the readiness of the Society to take charge of them, in case the Government should see fit to entrust them to the Society.

Communications were received—

1. From Captain E. Dalton, Debrughur, Assam, enclosing two papers, one, by himself, on Gold Washing in the Jugloo and Seesee rivers, and the other by Major Hannay, on Assam Gold Fields generally.

The first is the substance of an official report communicated by the Bengal Government in May last, and reduced into its present form by Captain D. at the suggestion of the Secretaries. Two drawings, which accompanied the paper, were laid upon the table.

2. From Captain Layard, Berhampur, forwarding copy of a sunud connected with the site of Gour, and promising soon to send a stone from the steps of the Muhammadan Durgah at Ghysabad bearing a Pali (?) inscription.

3. From F. E. Hall, Esq. Benares, transmitting a list of Persian books contained in the Library of his Highness the Rajah of Benares.

4. From Dr. McClelland, enclosing a Memorandum on the discharge of water by the Irrawaddy.

5. From W. G. Young, Esq. Under-Secretary to the Government of Bengal, forwarding a report, by Captain Sherwill, on the geology of Darjeeling, and of the mountains in its neighbourhood.

Captain Thuillier proposed that for the above, as one of a series of very valuable papers, which Captain Sherwill has contributed for the Journal, the best thanks of the meeting be accorded to him.

The President seconded the resolution, which was carried unanimously.

6. From C. Gubbins, Esq. Bijnore, submitting "Notes on the ruins at Mahavalipuram on the Coromandal Coast."

Read and confirmed, 7th Sept., 1853.

(Signed) J. R. Colvin.

Library.

The following books have been added to the Library since the last month.

Presented.

Selections from the Records of the Bengal Government, No. XI. Report on the Political States in the S. W. Frontier Agency, Revenue Administration of Assam, and the Wild Tribes bordering the South Frontier of Chittagong. 2 copies.—By the Government of Bengal.

Annual Report of the Grant Medical College, Bombay, 1852-3.—By J. Murehead, Esq. Principal of the College.

Description of the Caves of Kulvie in Malwa. By E. Impey, Esq. Agra, 1853, 8vo. Pamphlet (2 copies).—By R. N. C. Hamilton, Esq.

The Atmabodha with its Commentary; also the Tattwabodha: being two treatises of Indian Pantheism—Mirzapur, 1852—8vo. Pamphlet.—By the Editor.

Journal Asiatique, No. 2.—By the Asiatic Society of Paris.

The Oriental Christian Spectator for June, 1853.—By the Editor.

The Oriental Baptist, No. 80.—By the Editor.

The Calcutta Christian Spectator, August, 1853.—By the Editor.

The Upadeshaka, No. 80.—By the Editor.

Catalogue of a Collection of Ancient and Modern Italian books comprising several in Greek and Latin, printed in Italy, and offered for sale by C. F. Moloni.—By the Publisher.

Exchanged.

The Athenæum, for April, 1853.

The London, Edinburgh and Dublin Philosophical Magazine for May, 1853.

Purchased.

Journal des Savants, for April, 1853.

Comptes Rendus, Nos. 14 to 18, Vol. 36.

Spiegel's Grammatik des Parsisprache.

Akademische Verlesungen uber Indische Literaturgeschichte. Gehalten von A. Weber.

The Annals and Magazine of Natural History for May.

Bibliotheque des Croisades par M Michaud.

Schönberg's Travels in India, 2 Vols.

Hardy's Eastern Monachism.

Abstract of Meteorological Observations for the month of February, 1853.

Rangoon, 1*st March*, 1853.

	Thermometer Sunrise.			Barometer Sunrise.			Thermometer 9 A. M.			Barometer 9 A. M.			Thermometer Noon.			Barometer Noon.			Thermometer 3 P. M.			Barometer 3 P. M.			Thermometer Sunset.			Barometer Sunset.			Thermometer 9 P. M.			Barometer 9 P. M.			Remarks.
No instruments.	Maximum.	Minimum.	Min. of preceding observations.	Maximum.	Minimum.	Min. of preceding observations.	Maximum.	Minimum.	Min. of preceding observations.	Maximum.	Minimum.	Min. of preceding observations.	Maximum.	Minimum.	Min. of preceding observations.	Maximum.	Minimum.	Min. of preceding observations.	Maximum.	Minimum.	Min. of preceding observations.	Maximum.	Minimum.	Min. of preceding observations.	Maximum.	Minimum.	Min. of preceding observations.	Maximum.	Minimum.	Min. of preceding observations.	Maximum.	Minimum.	Min. of preceding observations.	Maximum.	Minimum.	Min. of preceding observations.	
Wet.....	71	57	63				71	63	69.154				80	65	72.765				82	63	73.53				No observation.	Ditto.	Ditto.				76	62	70.667			Weather this month, fine; wind variable, occasionally in gusts. No rain. Atmosphere dry. Mornings foggy at sunrise, but clearing off rapidly.
Dry.....	78	59	66.666				81	69	72.616				92	83	87.677				97	87	91.9										79	69	75.847			

J. Fayrer, M. D. *Asst. Surgeon,*
Field Hospital, Rangoon.

Date.	Thermometer.		Aneroid Barometer.	Force and direction of Wind.	Aspect of Sky.	Thermometer.		Aneroid Barometer.	Force and direction of Wind.	Aspect of Sky.	Thermometer.		Aneroid Barometer.	Force and direction of Wind.	Aspect of Sky.
	Wet.	Dry.				Wet.	Dry.				Wet.	Dry.			
1	..	..	No Instrument.	N. light.	Clear.	67	71	..	N. W. lt.	Clear.	65	89	..	S. W. fresh.	Cumuli.
2	57	59		Ditto.	Ditto.	63	71	..	Ditto.	Ditto.	65	83.5	..	Ditto.	Ditto.
3	57	60		Ditto.	Ditto.	63	71	..	N. E. do.	Ditto.	65	87	..	Ditto.	Ditto.
4	58	60		Calm.	D. fog.	66	71	..	Ditto.	Ditto.	..	..	..	S. W. light.	Cirri.
5	57	61		Ditto.	Slight fog.	..	..	..	....	....	..	..	..	....	....
6	62	64		Ditto.	Hazy.	69	74	..	N. E. lt.	Clear.	72	85	..	S. W. light.	Cirri.
7	63	65		Ditto.	Thick fog.	..	..	..	Ditto.	Ditto.	69	83	..	....	....
8	63	65		Ditto.	Hazy.	..	..	..	Ditto.	Ditto.	..	..	..	....	....
9	65	67		Ditto.	D. fog.	..	..	..	Ditto.	Ditto.	..	..	..	....	....
10	64	67		Ditto.	Ditto.	..	..	..	Ditto.	Ditto.	..	..	..	....	....
11	67	70		Ditto.	Ditto.	74	76	..	Ditto.	Ditto.	75	88	..	....	Cloudy.
12	..	..		....	Hazy.	..	..	..	Ditto.	Ditto.	..	..	..	....	....
13	..	..		....	Ditto.	..	..	..	Ditto.	Ditto.	..	..	..	....	....
14	66	69		Calm.	Cumuli.	68	74	..	Calm.	Ditto.	71	87	..	....	Cirri.
15	64	66		....	Hazy.	..	..	..	Ditto.	Ditto.	71	85	..	....	Ditto.
16	..	..		....	D. fog.	..	..	..	Ditto.	Ditto.	..	..	..	....	....
17	63	64		Calm.	Ditto.	67	69	..	Ditto.	Ditto.	..	..	..	....	....
18	64	65		Ditto.	Ditto.	69	71	..	Ditto.	Ditto.	73	86	..	....	Cumuli.
19	67	68		Ditto.	Ditto.	..	..	..	Ditto.	Ditto.	..	..	..	....	Ditto.
20	68	70		Ditto.	Ditto.	..	..	..	Ditto.	Ditto.	74	90	..	....	Ditto.
21	66	68		Ditto.	Fog.	..	..	..	Ditto.	Ditto.	77	87	..	....	Ditto.
22	68	78		Ditto.	Ditto.	..	..	..	Ditto.	Ditto.	77	88	..	....	Ditto.
23	67	69		Ditto.	Hazy.	72	74	..	Ditto.	Ditto.	75	89	..	....	Ditto.
24	68	69		Ditto.	Ditto.	73	76	..	N. E. lt.	Ditto.	74	91	..	....	Ditto.
25	69	71		Ditto.	Ditto.	74	81	..	Ditto.	Ditto.	77	91	..	....	Ditto.
26	69	73		Ditto.	Ditto.	74	75	..	Ditto.	Ditto.	80	92	..	D. fog.	Ditto.
27	71	72		Ditto.	Thick fog.	..	..	..	Ditto.	Ditto.	77	89	..	....	Cir.-cuml.
28	69	70		Ditto.	Ditto.	..	..	..	....	....	..	..	..	....	....
Total.	1512	1600	..	....	....	899	9444	..	. ..	....	1237	1490.5	..	....	....
Mean.	63	66.666	..	....	....	69.154	72.616	..	....	....	72.765	87.677	..	....	....

Meteorological Remarks for the month of February, 1853—(Continued.)

3 P. M.					Sunset.					9 P. M.					Remarks.
Thermometer		Aneroid Barometer.	Force and direction of Wind.	Aspect of Sky.	Thermometer.		Aneroid Barometer.	Force and direction of Wind.	Aspect of Sky.	Thermometer.		Aneroid Barometer.	Force and direction of Wind.	Aspect of Sky.	
Wet.	Dry.				Wet.	Dry.				Wet.	Dry.				
65	88	..	N. W. fog.	C.-cum.	..	..	..	..	..	..	..	..	N. lt.	Clear.	Fine, clear, cool morning.
..	..	..	Ditto.		..	..	..	..	..	62	69	..	Ditto.	Ditto.	
63	89	..	Ditto.	Cirri.	..	..	..	..	..	62	70	..	Ditto.	Ditto.	
63	89	..	N. lt.	Ditto.	..	..	..	..	..	..	..	..	..	..	Gusts of wind in afternoon.
72	90	..	Ditto.	Ditto.											
73	87	..	Ditto.	Cumuli.	..	..	..	..	..	68	72	..	N. lt.	Clear.	
71	89	..	Ditto.	Ditto.											
74	96	..	Ditto.	Ditto.	..	..	..	..	..	..	..	..	..	..	Whirlwind small, but overcrossing several native houses.
..	..	..	Ditto.	Ditto.											
..	..	..	Ditto.	Ditto.											
76	90	..	Ditto.	Ditto.	..	..	..	..	..	..	77	..	N. lt.		
.	..	..	Ditto.	Ditto.	..	..	..	..	..	69	77	..	Ditto.		
73	90	..	Calm.	Cirri.											
..	..	..	S. E. lt.	Cumuli.											
72	92	..	Ditto.	Ditto.											
71	93	..	S. W. fr.	Ditto.											
..	..	..	Ditto.												
72	93	..	Ditto.	..	..	..	..	..	..	..	..	..	..	Clear.	
81	92	..	Ditto.	..	..	..	..	..	..	75	75	..	Calm.	Ditto.	
80	92	..	Ditto.	..	..	..	..	..	..	74	77	..	Ditto.	Ditto.	
..	..	..	Ditto.												
82	96	..	Ditto.												
76	97	..	S. W. lt.	..	..	..	..	..	..	75	78	..	Calm.	Clear.	
76	96	..	Ditto.	..	..	..	..	..	..	76	78	..	S. E. lt.	Ditto.	
80	93	..	Ditto.	Steady.	..	..	..	..	..	71	78	..	Ditto.	Ditto.	
79	93	..	Strati.	Cumuli.	..	..	..	..	..	71	78	..	Ditto.	Hazy.	
78	93	..	S. E. lt.	Cirri.	..	..	..	..	..	72	79	..	Ditto.	Cirri.	
..	..	..	Ditto.	Ditto.	..	..	..	..	..	73	78	..	Ditto.	Ditto.	
1477	183.8	..	....	..	..	..	..	..	..	848	986				
73.85	91.9				..	..	..	..	..	70.667	75.847				

Abstract of Meteorological Observations for the month of March, 1853.

Rangoon, 1st April, 1853.

	Thermometer Sunrise.			Thermometer 9 A. M.			Thermometer Noon.			Thermometer 3 P. M.			Thermometer Sunset.			Thermometer 9 P. M.			Remarks.
	Maximum.	Minimum.	Min. of preceding observations.	Maximum.	Minimum.	Min. of preceding observations.	Maximum.	Minimum.	Min. of preceding observations.	Maximum.	Minimum.	Min. of preceding observations.	Maximum.	Minimum.	Min. of preceding observations.	Maximum.	Minimum.	Min. of preceding observations.	
Wet....	75	62	71.175	79	67	75.28	82	74	77.203	84	68	78.59	81	74	78.2	80	64	75.14	Weather, this month fine, but very hot.
Dry....	77	64	72.825	83	74	79.286	96	83	91.23	100	81	94.63	90	81	86.2	84	74	79.23	Occasional fresh breezes with thunder and lightning.
																			Nights cool, and early mornings foggy.
																			Winds variable, shower on the E. 0.15 inch fell.

	Barometer Sunrise.			Barometer 9 A. M.			Barometer Noon.			Barometer 3 P. M.			Barometer Sunset.			Barometer 9 P. M.		
	Maximum.	Minimum.	Min. of preceding observations.	Maximum.	Minimum.	Min. of preceding observations.	Maximum.	Minimum.	Min. of preceding observations.	Maximum.	Minimum.	Min. of preceding observations.	Maximum.	Minimum.	Min. of preceding observations.	Maximum.	Minimum.	Min. of preceding observations.
No instrument.																		

J. Fayrer, M. D. *Asst. Surgeon, Field Hospital, Rangoon.*

Meteorological Observations for the month of March, 1853.

Rangoon, 1st April, 1853.

Date.	Sunrise.					9 A. M.					Noon.				
	Thermometer.		Aneroid Barometer.	Force and direction of Wind.	Aspect of Sky.	Thermometer.		Aneroid Barometer.	Force and direction of Wind.	Aspect of Sky.	Thermometer.		Aneroid Barometer.	Force and direction of Wind.	Aspect of Sky.
	Wet.	Dry.				Wet.	Dry.				Wet.	Dry.			
1	..	..	..	....	....	..	..	..	....	....	..	..	..	....	Cumuli.
2	72	73	..	....	Dense fog.	78	81	..	Calm.	Cumuli.	80	91	..	E. light.	Dense fog.
3	74	76	..	c.h.v.close.	....	78	80	..	Ditto.	Ditto.	81	88	..	Calm.	Cirri.
4	..	..	..	Ditto.	Calm.	..	..	..	....	....	72.5	88	..	S. E. light.	Ditto.
5	65	66	..	Ditto.	Hazy & fog	68	73	..	W. lt.	Cirri.	70	85 5	..	Ditto.	Clear.
6	62	64	..	Calm.	Ditto.	67	76	..	Ditto.	Clear.	72	89	..	N. E. light.	Cumuli.
7	64	67	..	Ditto.	Dense fog.	73	80	..	N. E. lt.	Hazy.	72	88	..	S. E. light.	Hazy.
8	71	72	..	Ditto.	Ditto.	72	74	..	Ditto.	Fog.	77	90	..	Ditto.	Calm.
9	69	71	..	Ditto.	Hazy.	..	..	..	....	....	91	93	..	Ditto.	C.-Cumuli
10	66	69	..	D. C. v. w.	Hazy, Sult.	..	..	..	....	....	82	93	..	....	Ditto.
11	72	75	..	Cloudy.	Hazy.	77	81.5	..	S. by W. lt.	Clear.	79	93	..	S. E. light.	....
12	76	77	..	Ditto.	Dense fog.	78	87	..	Ditto.	Cumuli.	..	..	..	....	Cumuli.
13	74	75	..	Calm.	Ditto.	..	..	..	....	....	74	91	..	....	Ditto.
14	..	..	..	....	....	..	..	..	....	....	79	93	..	S E. light.	Ditto.
15	..	..	..	....	....	73	75	..	N. E. lt.	Cloudy.	76	96	..	Ditto.	Ditto.
16	73	74	..	Calm.	Hazy.	..	..	..	....	....	76	91	..	Ditto.	Cirri.
17	..	..	..	....	....	..	..	..	....	....	..	..	..	Ditto.	Cumuli.
18	..	..	..	....	....	75	80	..	....	Cumuli.	81	94	..	Ditto.	Ditto.
19	73	76	..	Calm.	Hazy.	78	82	..	N. E. lt.	Cirri.	82	92	..	....	Ditto.
20	74	76	..	....	Stdy.breeze.	79	83	..	Ditto.	Cumuli.	81	93	..	S. W. fog.	Ditto.
21	75	77	..	Den.clouds	Thunder.	79	81	..	Ditto.	S. Cloudy.	67	90	..	Ditto.	Do. Thun.
22	..	..	..	....	Cumuli.	77	81.5	..	Ditto.	Cirri.	79	90	..	N. W. light.	Cumuli.
23	..	..	..	....	Ditto.	76	82	..	Ditto.	Ditto.	80	93	..	Ditto.	Ditto.
24	..	..	..	....	Ditto.	..	..	..	Ditto.	....	75	95	..	Ditto.	....
25	72	73	..	N. W.	Ditto.	74	78	..	N. W. lt.	Cumuli.	76	88	..	Ditto.	....
26	70	71	..	Calm.	Cum.-str.	73	75	..	Ditto.	Ditto.	76	90.5	..	Ditto.	....
27	73	74	..	....	Dense fog.	78	85	..	Ditto.	Clear.	76	94	..	Ditto.	....
28	74	75	..	....	Cum. Hazy	74	..	..	....	....	77	95	..	Ditto.	....
29	..	..	..	....	Fog.	74	76	..	N. W. lt.	Cumuli.	72	90	..	Ditto.	Cirri.
30	..	..	..	....	Ditto.	77	81	..	Ditto.	Ditto.	..	..	..	Ditto.	....
31	74 5	75.5	..	Calm.	Ditto.	78	83	..	Ditto.	Ditto.	81	94	..	S W. fog.	Cumuli.
Total.	1423.5	1456.5	..	....	....	1656	1665	..	..	....	20.45	24.63	..	....	....

3 P. M.					Sunset.					9 A. M.					
Thermometer.		Aneroid Barometer.	Force and direction of Wind.	Aspect of Sky.	Thermometer.		Aneroid Barometer.	Force and direction of Wind.	Aspect of Sky.	Thermometer.		Aneroid Barometer.	Force and direction of Wind.	Aspect of Sky.	Remarks.
Wet.	Dry.				Wet.	Dry.				Wet.	Dry.				
79	94	..	S. W. fog.	Hazy.											
..	..	..	....	..	..	..	..	....	..	75 5	77.5	..	S. E. lt.	Cirri.	
82	93	..	S. E. F.	Cumuli.	..	..	..	....	..	77	81	..	Calm.	Ditto.	Strong breeze.
68	95	..	Ditto.	Ditto.											
..	..	..	....	..	..	..	..	....	..	64	74	..	S. E. lt.	Cirri.	
75	93	..	....	..	74	86	..	S. E. lt.	C.-Haz.	71	76	..	Ditto.	Cumuli.	
77	94	..	S. E. light.	Hazy.											
80	94	..	Ditto.	Ditto.	79	86	..	S. lt.	Hazy.						
81	95	..	Ditto.	Ditto.											
81	97	..	Ditto.	Clear.	..	..	..	....	..	75	79	..	S. E. lt.	Cumuli.	
..	..	..	Ditto fog.	Ditto.											
81	95.5	..	S. E. fog.	Cumuli.											
81	95.5														
76	93	..	D. steady.	Ditto.	..	..	..	....	..	..	..	..	....	..	Very hot.
..	..	..	Ditto.	..	..	..	..	....	..	..	..	..	....	..	Strong breeze.
..	..	..	Ditto.												
81	97	..	....	..	..	..	..	....	..	77	80	..	S. E. lt.	Cumuli.	Very hot.
82	95	..	Fog.	Ditto.	..	..	..	....	..	..	..	..	....	..	Cool fine nights.
..	..	..	....	..	..	..	..	....	..	80	84	..	S. W. lt.	Cumuli.	Thn. in distance
..	..	..	S. W. lt.	Cloudy.	..	..	..	....	..	80	81	..	S. b. E. lt.	Ditto.	with lightning.
77	78	..	Do. fog.	Rain.	77	81	..	S. E. lt.	Cloudy.	76	78	..	S. W. lt.	Cirri.	Cool.
78	81	..	Do. fog.												
81	92.5	..	Do. fog.												
82	97	..	S. W. fog.	Cumuli.											
75	99	..	S. W. fr.	Ditto.											
75	99	..	S. W. stdy.												
78	98		....	..	81	90	..	S. E. lt.	Cloudy.						
76	99.5	102 (at 4 P. M.)	S. W. lt.	..	80	88	..	Ditto.	Cumuli.	75	81	..	S. E. lt.	Cirri.	
84	99	103 (at 4 P. M.)													
76	100		S. W. fog												
80	97	..	S. W. lt	..	..	..	..	....	..	76	80	..	W. lt.	Clear.	Strong gale.
18.86	22.71	..	....	..	391	431	..	....	..	826.5	871.5				
78.59	94.63	..	....	..	78.2	86.2	..	....	..	75,14	79.23				

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of January, 1853.

Latitude 22° 33′ 1″ North. Longitude 88° 20′ 34″ East.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer.			Mean Dry Bulb Thermometer.	Range of the Temperature.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1								
2	*Sunday.*							
3	30.024	30.099	29.965	0.134	69.3	80.4	56.6	23 8
4	30.061	30.134	29.996	0.138	66.8	74.0	58.4	15.6
5	30.112	30.202	30.058	0.144	64.2	73.0	52.8	20.2
6	30.088	30.176	30 023	0.153	63.7	74.0	52.3	21.7
7	30.061	30.142	30.005	0.137	64 9	76.6	52.0	24.6
8	30.031	30.125	29.979	0.146	66.6	78.0	53.2	24.8
9	*Sunday.*							
10	29.995	30.064	29.939	0.125	70.8	81.2	59.8	21.4
11	29.985	30.053	29.935	0.118	69.8	79.6	57.7	21.9
12	30.019	30.084	29.974	0.110	69.5	77.4	60.2	17.2
13	30.060	30.154	29.999	0.155	67.4	75.9	56.6	19.3
14	29.993	30.075	29.942	0.133	65.3	70.4	57.0	13.4
15	30.024	30.095	29.976	0.119	65.0	73.0	55.3	17.7
16	*Sunday.*							
17	30.077	30.143	30.015	0.128	64.0	75.0	50.4	24.6
18	30.113	30.196	30.062	0.134	64.7	73.4	55.6	17 8
19	30.113	30 203	30.043	0.160	62 8	73.1	51.0	22.1
20	30.086	30.180	30.017	0.163	63.5	75.3	50.6	24.7
21	30.031	30 106	29.971	0.135	65.4	74.7	51.3	23.4
22	29.978	30.067	29.931	0.136	66.0	72.8	55.9	16.9
23	*Sunday.*							
24	29 930	29.992	29.864	0.128	66.3	73.0	59.2	13.8
25	30.011	30.097	29.953	0 144	66.6	76 8	55.0	21.8
26	29 996	30 077	29.925	0.152	66.5	77.2	54.0	23.2
27	30.015	30.091	29 964	0.127	64.9	72.0	57.9	14.1
28	30.073	30.146	29.978	0.168	65 9	74.5	57.0	17.5
29	30.119	30.212	30.066	0.146	66.1	75.3	55.5	19.8
30	*Sunday.*							
31	30.016	30.123	29.923	0.200	64.1	74.8	50.7	24.1

Compared by Gopeenath Sen.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of January, 1853—*(Continued.)*

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a cubic foot of air.	Additional weight of Vapour required for complete saturation.	Mean degree of Humidity complete saturation being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1								
2	*Sunday.*							
3	63.7	5.6	60.2	9.1	0.527	5.80	2.03	0.741
4	62.3	4.5	59.5	7.3	0.514	5.70	1.56	.785
5	57.9	6.3	53.2	11.0	0.416	4.64	2.05	.694
6	58.0	5.7	53.8	9.9	0.424	4.73	1.86	.718
7	59.3	5.6	55.3	9.6	0.447	4 97	1.88	.726
8	60.8	5.8	56 9	9.7	0.471	5.21	2.00	.723
9	*Sunday.*							
10	65.4	5.4	62.3	8.5	0.565	6.20	2.00	.756
11	65.8	4.0	63.6	6.2	0.589	6.49	1.46	.816
12	65.0	4.5	62.4	7.1	0.566	6.24	1.64	.792
13	62.7	4.7	59.7	7.7	0.518	5.73	1.66	.775
14	61.6	3.7	59.3	6.0	0.510	5.67	1.26	.818
15	58.5	6.5	53.8	11.2	0.424	4.72	2.15	.687
16	*Sunday.*							
17	57.1	6.9	51 7	12.3	0.396	4.41	2.24	.663
18	58.5	6.2	54.0	10.7	0.427	4 75	2.05	.699
19	56.3	6.5	51.1	11.7	0.388	4.32	2.09	.674
20	57.6	5.9	53.2	10.3	0.416	4.65	1.90	.710
21	59.2	6.2	54.8	10.6	0.439	4 87	2.08	.701
22	61.6	4.4	58.8	7.2	0.502	5.57	1.51	.787
23	*Sunday.*							
24	62.7	3.6	60.5	5.8	0.531	5.90	1.25	.825
25	62.1	4 5	59.3	7.3	0.510	5.66	1.55	.785
26	60.7	5.8	56.8	9.7	0.470	5.20	1.99	.723
27	60.0	4.9	56.6	8.3	0 467	5.20	1.65	.759
28	62.5	3.4	60.4	5.5	0.529	5.88	1.18	.833
29	59.9	6.2	55.5	10.6	0.450	4.99	2.11	.703
30	*Sunday.*							
31	58.1	6.0	53 7	10.4	0.423	4.72	1.95	.708

Compared by Gopeenath Sen.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of January, 1853—(Continued.)

Date.	Max. Solar radiation.	Rain.	Prevailing direction of the Wind.	General aspect of the Sky.
	o	Inc.		
1				
2	*Sunday*			
3	..	..	Calm or N.	Cloudless.
4	..	..	S. W. or N. W.	Scattered ∩ i till morn, and nearly cloudless afterwards.
5	..	..	N.	Cloudless.
6	..	..	Calm or N. W.	Ditto.
7	..	..	Ditto.	Ditto.
8	..	..	Ditto.	Cloudless till morn, scattered _ i during day and cloudless afterwards.
9	*Sunday.*			
10	..	..	Calm or S. E. or S.	Cloudless.
11	92.8	..	Calm or N. or S. W.	Cloudless till morn, scattered _ i during day and cloudless afterwards.
12	90.3	..	S. or N. W.	Cloudless till morn, scattered _ i or ∩ i or \ i during day, and cloudless afterwards.
13	88.0	..	N. E. or N. W.	Cloudless till 4 A. M scattered \ i till 6 P. M. and cloudless afterwards.
14	81.0	..	Calm or N. E. or N. W.	Cloudless till 6 A. M., and overcast afterwards.
15	85.0	..	W. or N. W.	Overcast till 3 A. M. scattered ∩ i and _ i till noon, and cloudless afterwards.
16	*Sunday.*			
17	92.3	..	Calm or N. or N. W.	Cloudless till 5 A. M. scattered \ i or _ i or ~ i till 6 P. M. and overcast afterwards.
18	84.0	..	N. W. sharp at 3 A.M.	All kinds of clouds till 2 P. M. and cloudless afterwards.
19	87.0	..	N. W.	Cloudless.
20	91.3	..	Calm or N. W.	Ditto.
21	88.3	..	Ditto.	Cloudless till 4 A. M. scattered or close \ i
22	82.4	..	N. W.	Scattered or close \ i or _ i till 6 P. M. and overcast afterwards.
23	*Sunday.*			
24	89.8	..	N. or N. E.	Thin clouds till 4 A. M. Dense or Light ∩ i till 6 P. M. and cloudless afterwards.
25	92.8	..	S. W. or N. or Calm.	Cloudless till 11 A. M. ∩ i till 5 P. M. cloudless afterwards.
26	93.0	..	N. or W.	Cloudless till 11 A. M. _ i or ↖ i till 6 P. M. cloudless afterwards.
27	80.4	0.10	N.	↖ i till 6 A. M. and overcast afterwards.
28	95.7	..	N. W. or Calm.	Overcast till noon, ↖ i or _ i till 4 P. M. clondless afterwards.
29	88.0	..	N. sharp from 11 A.M. till 3 P. M.	Cloudless.
30	*Sunday*			
31	87.3	..	Calm or N. W. or W.	Cloudless.

\ i ..... Cirri.
∩ i ..... Cumuli.
— i ..... Strati.
↖ i ..... Cirro-cumuli.
_ i ..... Cirro-strati.
~ i ..... Cumulo-strati.
↖_ i ..... Nímbí.

Errata in No. III. *of* 1853 *of the Journal of the Asiatic Society in the Paper entitled—*

Report on the Geological Structure, &c. of the Salt Range in the Punjaub, &c. &c.

Page	line	
230	9,	*for* Kaffin *read* Kaffir.
,,	12,	*for* Kovana *read* Korana.
,,	,,	*for* rise *read* rises.
232	3,	*for* Punchah *read* Punchal.
,,	24,	*for* map *read* mass.
,,	33,	*for* Kuttba *read* Kuttha.
233	3,	*for* Chountuah *read* Chounterah.
,,	10,	*for* Kaffin *read* Kaffir.
,,	22,	*for* strata *read* straths.
234	4,	*for* Vehee *read* Vahee.
,,	28,	*for* kurrul *read* kureel.
,,	30,	*for* specigera *read* spicigera.
235	4,	*for* kurul *read* kureel.
,,	5,	*for* chenopodiacious *read* chenopodiaceous.
,,	6,	*for* java *read* lana.
,,	28,	*for* Kuringurli *read* Kuringuli.
,,	29,	*for* Katass *read* Kutass.
,,	,,	*for* Kuhun *read* Kahun.
,,	32,	*for* Kuhor *read* Kuhar.
,,	33,	*for* ditto *read* ditto.
236	11,	*for* lakes *read* lake.
,,	,,	*for* any *read* very.
,,	13,	*for* Nunva *read* Nurwa.
,,	24,	*for* Khubakkie *read* Khubukkie.
,,	,,	*for* Lone Lihesur *read* Sone Sikesur.
,,	27,	*for* ditto *read* ditto.
,,	28,	*for* inland *read* inclosed.
,,	32,	*for* Lihesur *read* Sikesur.
237	17,	*for* Europeans *read* European.
238	20,	*for* Marie *read* Maree.
,,	28,	*for* Lurdi *read* Surdi.
239	2,	from foot *for* bottoms *read* bottom.
241	11,	*for* Milawan *read* Nilawan.
242	14,	*for* trappian *read* trappean.
,,	21,	*for* Kemah *read* Keurah.
244	5,	from bottom *for* thin *read* their.
246	4,	*for* roots *read* roofs.
,,	9,	*for* salt *read* mineral and.
,,	21,	*for* strifes *read* strikes.
,,	25,	*for* Kalibay *read* Kalibag.
,,	29,	*for* Marree *read* Maree.
249	11,	*for* Sugaswalla *read* Sujeewalla.
,,	,,	*for* efforts *read* effects.
250	22,	*for* give their *read* give to their.
,,	24,	insert a point *after* through it.
,,	,,	*for* wherever *read* Wherever.
,,	26,	*for* seem to be *read* seem to lie.
252	9,	*for* Gredi *read* Grechi.
,,	18,	*for* up to the *read* up the.

Page	line	
253	2 and 3,	*for* on the scarped *read* "or the scarped."
,,	4,	*for* Vevhalee *read* Vuhalee.
,,	11,	*for* Vusual *read* Vusnal.
255	24,	*for* to be most *read* to be a most.
,,	34,	*for* calcarious *read* calcareous.
257	25,	*for* this concretion *read* these concretions.
258	8,	*for* copper, as *read* copperas.
,,	32,	*for* Bayaar *read* Bazaar.
259	13,	*for* Poonah *read* Boonáb.
,,	14,	*for* Imapore *read* Surafur.
,,	15,	*for* Gurjah *read* Gurjak.
,,	20,	*for* mount *read* mounts.
,,	,,	*for* Drengum *read* Drengun.
,,	,,	*for* where *read* whence.
260	1,	*for* Kaffee *read* Kaffir.
,,	,,	*for* Dak *read* Dok.
261	5,	*for* A lower limestone, &c. *read* "A Lower limestone, &c." in italics.
262	3,	from foot *for* on *read* of.
263	11,	*for* magnesia *read* magnesian.
,,	16,	*for* Zinnanee *read* Zamanee.
,,	,,	*for* Chederos *read* Chederoo.
,,	21,	*for* Nummaal *read* Nummul.
,,	31,	*for* Zimanee *read* Zamanee.
264	30,	*for* and intercalated *read* and are intercalated.
265	14,	*for* shales *read* slabs.
,,	23,	*for* Salira *read* Lalira.
267	11,	*for* seas *read* lias.
,,	23,	*for* M. de Verueuil *read* M. de Verneuil.
,,	24,	*for* Cara *read* Cora.
,,	32,	*for* ditto *read* ditto.
268	14,	*for* Sam Sikesur *read* Sone Sikesur.
,,	21,	*for* Mulakhail *read* Mulokhail.
,,	25,	*for* Dak *read* Dok.
,,	28,	*for* Soohinam *read* Sooliman.
271	2,	*for* Umlakhail *read* Mulokhail.
,,	8,	*for* ditto *read* ditto.
272	27,	*for* this *read* the.
,,	34,	*for* Jamieson *read* Jameson.
274	9 and 10,	*for* connected with *read* converted into.
276	1,	*for* Musakhail *read* Mulokhail.
,,	9,	*for* block hard *read* black band.
,,	13,	*for* Kuneegoornul *read* Kuneegoorum.
,,	25,	*for* Pecoptaris *read* Pecopteris.
,,	32,	*for* Pecteus *read* Pectens.
277	3,	*for* osselit *read* osselet.
,,	6,	*for* concave or convex *read* concavo-convex.
,,	7,	*for* thin *read* their.
,,	9,	*for* a disc *read* each disc.
278	7,	*for* crustacian *read* crustacean.
,,	last line	*for* throw out *read* then out.

A. Fleming.

Dera Ghazee Khan, Augt. 22nd, 1853.